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ABSTRACT

The purpose of this conference was to provide a framework for improving the quality and increasing the quantity of nutrition education research. Emphasis was placed upon examining the research process from the standpoint of theory or model building. Presentations were made on: (1) "Nutrition Education Research Policy in Washington" (Luise Light); (2) "Nutrition Education Research: Perspectives and Directions" (Barbara Shannon and Susan Oace); (3) "Nutrition Education Research: Focus from Previous Conferences" (Laura Sims); (4) "Theory and Model Building" (Herbert Walberg); (5) "Toward a Framework for Theory Building in Nutrition Education Research" (Isobel Contento); (6) "Multimedia and Bicultural Approach to Nutrition Education" (Henry Breitrose); (7) "The Need for Bicultural and Multimedia Approaches" (Johanna Dwyer); (8) "The Functions of Theory" (Peter Miller); (9) "Food Preferences and Eating Patterns" (LeAnn Birch); (10) "Usefulness of Psychological Traditions for Theory Building" (Isobel Contento); (11) "Social Science Methodologies for Studying Parents' Perceptions of Children's Food Activities" (Audrey Maretzki); (12) "Planning and Evaluating Television Materials on Nutrition" (James Swinehart); and (12) "Studying the Role of Television for Nutrition Education" (Katherine Clancy). (JD)

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STRATEGIES FOR THEORY BUILDING

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Nutrition Education Research Conference

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Marriott's
Lincolnshire Resort
Lincolnshire, Illinois

November 11-13, 1981

Sponsored by:
National Dairy Council
and
United States Department of Agriculture

Planning Committee:

Judy Brun

Ardyth Gillespie

Luise Light

Laura Sims

Harriet Talmage

Wednesday, November 11

7:00 p.m.	First General Session Judy Brun, Presiding	Ottawa and Chippewa Rooms
	Welcome Luise Light M. F. Brink	
	"Nutrition Education Research Policy in Washington"	
	Luise Light Katherine Clancy	
	"Nutrition Education Research: Perspectives and Directions"	
	Barbara Shannon Susan Oace	
	"Nutrition Education Research: Focus from Recent Conferences"	
	Ardyth Gillespie Laura Sims	
9:30 p.m.	Reception	Salon A

Thursday, November 12

8:00 a.m.	Second General Session Harriet Talmage, Presiding	Ottawa and Chippewa Rooms
	"Theory and Model Building"	
	Herbert Walberg	
	Case Study I: "Multimedia and Bicultural Approach to Nutrition Education"	
	Henry Breitrose	
10:00 a.m.	Coffee Break	
10:15 a.m.	Discussants: Johanna Dwyer Peter Miller	
11:00 a.m.	Small Group Discussions	Conference Parlors
12:00 Noon	Buffet Luncheon	North Bridge

NUTRITION EDUCATION RESEARCH: STRATEGIES FOR THEORY BUILDING

CONFERENCE PROCEEDINGS

Judy K. Brun, Ph.D., Editor
Andre F. Rhoads, Technical Editor

Sponsored by National Dairy Council and the
United States Department of Agriculture

Marriott's Lincolnshire Resort
Lincolnshire, Illinois

November 11-13, 1981

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These Conference Proceedings are based upon presentations and deliberations of the Nutrition Education Research Conference, STRATEGIES FOR THEORY BUILDING, held November 11-13, 1981. The Conference was supported by the National Dairy Council's Division of Nutrition Education and the Human Nutrition Information Service of the United States Department of Agriculture.

The Conference brought together leaders in nutrition education research and related disciplines who have the common goal of improving effectiveness of nutrition education. These leaders studied the research process in nutrition education from the standpoint of theory building and theory testing. Theory was viewed as an important concept in the process of designing coordinated and integrated research in nutrition education.

Coordinator of the Conference was Dr. Judy Brun, Evaluation Research Associate in the Division of Nutrition Education at the National Dairy Council. Conference Planning Committee members were Dr. Isobel Contento, Associate Professor of Nutrition and Education at Teachers College, Columbia University; Dr. Ardyth Gillespie, Assistant Professor in the Division of Nutritional Sciences at Cornell University; Dr. Luise Light, Director, Nutrition Guidance and Education Research Division, Human Nutrition Information Service, USDA; and Dr. Harriet Talmage, Director of the Office of Evaluation Research and Professor of Education at the University of Illinois at Chicago.

The production of the Conference Proceedings was coordinated by the National Dairy Council. Dr. Brun reviewed and edited the transcripts of the presentations and the deliberations of the discussion groups and prepared the manuscripts for this publication. Mr. Andre Rhoads served as technical editor of the manuscripts, Mrs. Judy Mercier coordinated production and provided proof-reading services, Mrs. Jeanne Travis managed the several drafts through word processing, and Mr. Richard Selover provided graphics design services.

The reader is challenged to study the Proceedings and to develop ways to implement recommendations and proposals. Only in this way can research influence DIRECTIONS FOR THE FUTURE, theme of National Dairy Council's 1978 Nutrition Education Research Conference, through STRATEGIES FOR THEORY BUILDING, theme of this NDC-USDA 1981 conference.

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CONFERENCE READING LIST

1. Travers, R. M. W. An Introduction to Educational Research. 4th Edition. New York: Macmillan, 1978. Chapter 3: "The Place of Theory in Educational Research," pp. 41-64.

2. Van Dalen, D. B. Understanding Educational Research: An Introduction. New York: McGraw-Hill, 1979. In Chapter 2, the section "Differences between the Social Sciences and the Natural Sciences," pp. 28-32 and in Chapter 3, the sections "Functions of Facts" and "Nature of Theories," pp. 51-62.

INTRODUCTIONS AND WELCOMES

Judy Brun:

This is the opening session of the Conference, Nutrition Education Research: Strategies for Theory Building. There is much I'd like to tell you about how this conference came to be and especially about how its theme was developed, but I'm going to postpone that until a little later because I have asked two very important people to officially welcome you to it.

First, I'd like to introduce a lady with whom many of you are already well acquainted, Luise Light, Head of the Human Nutrition Information and Dietary Guidance Division of the United States Department of Agriculture. Luise was one who asked the questions to get us thinking in the right direction, and I'm sure you will see evidence of this througout the conference. Dr. Light.

Luise Light:

As Judy can tell you, I'm much better at questions than answers. On behalf of the United States Department of Agriculture, Secretary Block and Mary Jarrett, Assistant Secretary for Food and Consumer Services, I'm very pleased to welcome you to this conference. I bring you special greetings from Dr. Mark Hegsted, whom many of you know, the senior scientist in nutrition in the Department of Science and Education.

Mark remains vitally committed to the enterprise of nutrition education research. His leadership in this area has resulted in some of the program development we have been able to do in the last three or four years. The Department of Agriculture has a long and proud history of responsibility, both in providing human nutrition information and education and in the support of research in those areas.

The Reagan administration remains committed to these enterprises although it recognizes that the times call for new approaches and directions by all federal agencies. The President's economic recovery program requires all the public programs to reassess priorities and to search for new modes for delivering leadership. One of the ways the administration believes we can do this is by working with interested groups in the private sector. Our mutual resources and expertise can be applied to common goals. This new partnership allows us to meet our commitments while maximizing our resources.

This partnership approach was taken in holding this conference. The National Dairy Council has a distinguished tradition of support for research in nutrition education and USDA has a similar tradition. We join forces in the sponsorship of this conference in order to maintain the creative dialogue among nutrition education researchers which has enlivened the field in the last few years. Neither group alone had the resources to commit to this purpose, but together we were able to get the job done.

Perhaps this partnership theme has direct application to this conference and to all of us here as well. No one in nutrition education research can do the whole job alone; certainly not any more. We need to build on each other's insights and experiences. The many disciplines that are represented here provide a rich fabric of perspectives and methodologies on which to base our individual research formulations. With the resource base to support nutrition education research eroding, we need to spend our capital wisely. If we know that the wheel has already been patented, why not move on to a bicycle or a flying machine? Nutrition education research is ready to move on.

I'm reminded of an H. G. Wells film called "Things to Come." Maybe some of you have seen it, at least in its various re-creations since the 1930s. In the concluding moments, a handful of people are watching a space ship as it sets off for the moon. The launching of the ship was achieved in the face of vigorous opposition from a 21st-Century Liddite movement wanting to call a halt to scientific progress. As the ship is wending its way into space, the spectators are speculating about the implications of this space travel for future voyages. One of the group refers to the terrifying size of the universe and the puny nature of man. "Can it really be our destiny to conquer all of that? Is there no rest for man from the unrelenting quest for knowledge?" "No," replies another in the group. "Once we have taken the first steps down the path of knowledge and understanding we must take all those that follow. The alternative is to do nothing, to live with the incest and the dust. The choice is simple: the whole universe or nothing."

Well, which shall it be for us?

Judy Brun:

Thank you, Luise, for skillfully reminding us of our responsibilities. I'd now like to introduce the person who suggested to me when I first joined National Dairy Council that we should be sponsoring conferences in nutrition education research: the President of National Dairy Council, Dr. Brink.

M. F. Brink:

Thank you, Judy. Good evening to all of you. On behalf of the Board of Directors and the staff of National Dairy Council, I, too, wish to welcome all of you to this conference.

The National Dairy Council has, since 1915, promoted optimal health through leadership in nutrition education. And, since 1941, one leadership approach that we have taken has been the sponsoring of annual nutrition research conferences. These conferences have served as a basis for our nutrition research program through which we have been able to support research that has made an important contribution to theory and knowledge in the field of nutrition and, therefore, to the practice of nutrition.

In 1978 National Dairy Council sponsored the first nutrition education research conference. We believed the time was right for focusing our attention on this area of research. I believe we were correct in our assumption because our conference was followed, as all of you are aware, by several other conferences devoted specifically to research in nutrition education. The 1978 Conference was titled "Directions for the Future" and brought together 42 leaders in the field. Several of you, as a matter of fact, attended and participated in that conference as well as the other conferences that were subsequently held. We examined the historical foundations, analyzed governmental activities, determined current status and identified priorities for future efforts in nutrition education research. The published proceedings of the 1978 conference have been used in a variety of ways: first, to help stimulate the thoughts and actions of other conferences; second, to provide the groundwork for conferences that followed; and third, and very importantly, to guide decision-making at National Dairy Council.

Recent activity within the federal government, the series of recent conferences, and the changing nature of the major journal in the field all indicate to me that activity in nutrition education research is growing and expanding. National Dairy Council is interested in maintaining this momentum because we strongly believe that research in nutrition education is necessary to its effectiveness. And that is a major part of the Dairy Council mission, namely, improving the effectiveness of nutrition education.

This conference is unique, we feel, because it illustrates a renewed climate of cooperation between the federal government and industry-sponsored nutrition education organizations. Without the support of the United States Department of Agriculture, we could not have invited as many of you to this conference. Luise, I would like to thank you sincerely for your help. Also, please convey my appreciation to Deputy Assistant Secretary John Bode, to Assistant Secretary Mary Jarrett and to Secretary John Block. I would also like to thank Ardyth Gillespie, Laura Sims and Harriet Talmage for their guidance and contributions in joining Luise Light and Judy Brun on the planning committee and chairing the various sessions.

Approximately 45 of you have gathered at this conference to assume major responsibility for maintaining the momentum in nutrition education research. You will be investigating strategies for theory building through nutrition education research with the ultimate purpose of improving the effectiveness of nutrition education. I wish you well in your work and hope that we will have many future opportunities to work together toward this purpose, not only at this conference but during the years ahead as well.

Judy Brun:

Thank you, Dr. Brink. I would emphatically support your comments about the importance of this conference.

I would now like to introduce the others who have made major contributions to the success of this conference. Most importantly, I would like you to meet the conference secretary, Judy Mercier. She, of course, has done more work than any of the rest of us in making this conference happen, and her experience in this kind of activity and her cooperation certainly make my job a lot easier.

I would also like you to meet the other members of the planning committee. Laura Sims had major responsibility for the five working conferences held just over a year ago at Penn State, and because of that experience and her record as a researcher, I asked her to be a member of this planning committee. Harriet Talmage, as Director of the Office of Evaluation Research at the University of Illinois at Chicago, has made major contributions to the developing methodologies for evaluating nutrition education and has, in the last few years, become a very important part of the field of nutrition education research and evaluation. The fifth member of our planning committee, who is not here tonight because of illness, is Ardyth Gillespie, one of the co-directors of the Cornell University Nutrition Education Research Conference held a year ago last spring. Ardyth is vitally interested in this topic of theory building.

You need to meet two other people from the National Dairy Council who have made contributions to this conference. Dick Selover, our Manager of Design and Production, and the person who is responsible for the look and colorfulness of our nutrition education programs and materials, worked with the artist to interpret the theme of our conference through the graphics and colors you see on the program cover. Another person I would like you to know is Gloria Kinney. Gloria is Vice President of the Division of Nutrition Education at National Dairy Council and has supported and encouraged us throughout the planning of this conference.

Let me spend a few minutes describing our plans for the work of the conference. Our broad purpose is to contribute to improving effectiveness of nutrition education. You would probably say, "Well, that's what we are all up to all of the time," and that certainly is true. More specifically, we are going to work toward that purpose through improving the quality and increasing the quantity of nutrition education research. That, too, is what all of us in one way or another are up to or we wouldn't have been invited to this particular conference. But let's be even more explicit about this conference.

Tonight we are going to look at national policy development that affects research in nutrition education, gain perspective from those who have been very close to the research and writing going on in the field and determine the strides we have made toward our overall goals as a result of the recent conferences on this subject. We look at this evening's session as orientation that will be useful and necessary to the focus of the conference.

The focus of this conference is to study the research process from the standpoint of theory building. Or you may prefer to say theory generation. Or you may wish to add model building to that phrase. The planning committee spent most of one day in deep intellectual discussion about the theme of the conference. I'm not sure I should admit things like that, but I do want you to know that we worked long and hard to develop the conceptual idea for this conference.

We agreed that an approach that could be very helpful to nutrition education research at this particular time in its genesis would be a setting where we could investigate the concept of theory building and have an opportunity to study selected illustrations from the real world of research in some depth. We chose this topic for study because we believed more attention is needed to the process of designing research in nutrition education that has better connections to research already completed and research that is to come. The three case studies or scenarios, to use current jargon, have been selected because each illustrates research designs that have been theory-based, have given attention to theory building, and which provide, then, further opportunities for sound theory testing. Our ultimate concern is how we can improve our research practice as nutrition education becomes more sophisticated and recognized as a field for research.

As you work in your discussion groups tomorrow and on Friday you will no doubt identify related issues that increase the complexity of what at first might sound simple. For example, is there a conceptual framework for the field on which we can hang our research hats if we are to become better theory builders? What political issues must be arbitrated or at least identified and defined as we design, conduct, interpret and use research?

But enough of the rationale for why we are here and why we are going to be doing what we are going to be doing. The planning committee has completed its task as facilitators. The real success of the conference now depends on each of you as you make your contributions through your presentations, your reactions and especially the small-group discussions. Success also depends on your contributions after you leave the conference through the ways you apply the concepts developed at this conference in your work.

NUTRITION EDUCATION RESEARCH POLICY IN WASHINGTON

Luise Light

It seems appropriate, as we consider the future needs of the field of nutrition eudcation research, to look back at how it came to pass that nutrition education research became a priority for the federal government.

In 1977, I was invited to attend a meeting in the new Executive Office Building of The White House to discuss nutrition research priorities. The invitation was proferred by Dr. Grace Ostenso who was an official member of the Federal Nutrition Research Task Force convened by the Office of Science and Technology Policy (OSTP) of The White House. The committee had met for some time, deliberating on a broad spectrum of issues assumed under the banner of Nutrition Research. Nutrition education research was not a player in the early rounds of discussions. It emerged as a contender for nutrition research priority honors, principally because of the interest in the subject by the staff of OSTP. Dr. Ostenso invited my participation in order to help her make a clear and pressing case for the funding needs of this neglected research area. We recognized that other participants in the Task Force had limited knowledge of or interest in nutrition education research. Getting their attention, much less their support, was not going to be an easy matter.

The meeting progressed without a single reference to nutrition education research. Toward the end of the meeting, the chairman, remembering the neglected agenda item, proposed that we write up something "about your areas" and bring it back to the next meeting. The door of opportunity was opened.

Our reports were presented at the next meeting. Little discussion followed but the material became part of the record. We heard nothing for some time after this meeting. Staff of OSTP developed a report based on recommendations submitted by the federal scientists who participated in the proceedings. To our great surprise, the report issued by the staff listed nutrition education research as one of the critical areas for increased federal funding.

From that point on, other things began to happen. A few members of Congress noticed nutrition education research and focused attention on it. Congressional hearings were held, and a series of deliberative research reviews were conducted by both the Government Accounting Office and the Office of Technology Assessment. These reports heralded nutrition education research as an area requiring federal attention. The authors of the original Office of Science and Technology Policy report looked hard to find dollar resources invested in nutrition education research in support of national nutrition education programs. The resources were not identifiable. That doesn't mean that none were being spent; it meant that they could not be found among budget line items. Well, you know what happens when you study an issue, more study is usually needed.

A Subcommittee of the Office of Science and Technology Policy was set up to define priority areas of research, identify researchable issues, and make recommendations for federal action.

A report on basic human nutrition research was issued by the Joint Subcommittee on Human Nutrition Research in 1980. A second report on international nutrition research is in the works. The third report which finishes the series, on nutrition education research, will be issed by midyear of 1982. It is now almost complete.

The group which has put together the nutrition research reports has representation from eight agencies of government. It is co-chaired by Dr. Mark Hegsted of the United States Department of Agriculture and Dr. Artemis Simopolous of the National Institutes of Health. Among the drafters of the nutrition education research report are Dr. Kate Clancy, myself, and many others. An interesting facet of this report is the recognition that we couldn't identify any 1977 federal dollars spent on nutrition education research but in 1980 we identified $16,000,000. It's quite clear, too, that in 1981 budgets we would find less than $16,000,000 spent on nutrition education research. To some extent the 1980 figure is an anomaly, the result of several large-scale projects converging at a point in time. It is probably not typical of federal investment in nutrition education research.

The definition of nutrition education research which will be included in the report is based on the components published in the original basic nutrition research report: 1) studies of dietary practices, food consumption patterns and their determinants, and 2) studies on methods for informing and educating the public about nutrition, health and dietary practices. The definition subsumes a variety of issues. We have addressed some of the subsets of issues under each of the two major themes.

There has been little problem with the definition of nutrition education research. The committee accepted the definition provided by the staff writers of the report. However, a new issue was introduced into the definition in a recent draft of the report. The new issues is development and evaluation of nutrition curricula for professionals.

The purpose of the federal report on nutrition education research is to focus attention on areas which deserve more research attention. It draws on the recommendations of previous conferences that have reviewed needs in the field of nutrition education research. Examples are those conducted by National Dairy Council, Cornell University, and Pennsylvania State University.

I think the report has the possibility of guiding groups other than the federal agencies. We hope that it will provide guidance, orientation, and basic information to the broader nutrition research community. To my knowledge it is the first report to outline in detail the nature of the nutrition education research conducted in 1980 by each federal agency with responsibility for nutrition education research. It identifies the division or unit of the agency which conducts the research, the purpose of the research, and the kinds of methods that are applied.

A lot of research has been conducted. But we are at a crossroads. The interest and the will are present to continue research in this area. The stumbling block is the same one that confronts many, many public programs--the assignment of priority.

Question-and-Answer Session

Question:
Could you give us a good sense of concreteness about what the Nutrition Education and Training web of research includes? Does it include things that are more biochemical in focus rather than strictly education as such?

Luise Light:
We have been very careful not to include things which are not clearly nutrition education research. I think you will find fewer such anomalies in this report than in others. I feel fairly confident that the bulk of the $16,000,000 we found in budgets for nutrition education research was spent on what we would all agree are legitimate nutrition education research projects.

Question:
Do you feel comfortable in describing some of the more interesting projects or directions suggested in the coming report?

Luise Light:
I've stopped short of actually describing to you the specific detail of the report. I have been asked not to do so since we are now in final draft. But the final meeting for review of the draft is Monday. The report must also be reviewed by the federal agencies who must sign off on it. So I can't yet share with you the details.

Question:
I wonder if you could give us the top three projects that were funded in 1980?

Luise Light:
The largest amount of nutrition education research is conducted by the National Institutes of Health, the Center for Disease Control and the Food and Drug Administration as a part of their health promotion and disease prevention activities. Examples are the clinical trials, the Stanford project, the MR. FIT project, development and testing of nutrition information materials, and research on food and nutrition labeling. Those are the "biggest buck" programs. I believe the NIH component, which amounts to $7.6 million, is from those two major complex studies in which nutrition education research is a component, the Stanford project and the clinical trials.

Question:
In the area of nutrition curriculum for professionals, what professionals are included in that?

Luise Light:
That issue will be discussed on Monday and whether or not it will emerge as a part of the definition of nutrition education research is not yet clear. The issue that underlies its inclusion in nutrition education research is concern about the need to develop, test and evaluate curricula for training allied health professionals including physicians, dietitians and all other manner of health-related professionals. This could comprise a big part of future nutrition education research budgets. It is an important area but whether it belongs in nutrition education research rather than in nutrition education is the issue.

Question:
Did this $16 million spent in 1980 include evaluation studies?

Luise Light:
Yes, it did. The figure includes a relatively large expenditure by the Food and Nutrition Service and the Federal Extension Service which covered nutrition education program evaluations. The committee has chosen to include that as part of the definition of nutrition education research and as part of the funding identified.

Question:
What kind of decisions did you make about this in the Women, Infant and Children (WIC) evaluations?

Luise Light:
We were given budget figures by the Office of the Budget in USDA. We are told those dollar figures relate specifically to nutrition education evaluation in WIC.

Question:
Sometimes it's very difficult to sort out what is the research component of a project in terms of budgetary expenditures. How did you handle this?

Luise Light:
There has been quite a lot of give and take over that issue in the committee. Certain agencies have felt very strongly about that. We have had several rounds of going back to our budget people and saying, "Listen here, are you sure? Someone may throw the whole thing out if you haven't given us the right facts." The feeling now is that it is as good a number as we can get, as close to what we wanted as is reasonable to expect from government budget books.

Judy Brun:

We can finally get at the reason for the title of your presentation in the program, Luise. I was talking with Kate Clancy about three weeks ago as I was trying to get program copy ready for the printer. I was talking with Kate because I couldn't reach Luise and they were both working on this report. Kate said, "I'm not sure that we are going to be able to officially say anything by November 11 because we don't know where the discussions are yet in terms of this final joint panel report. We need a title that will fit this situation." The title we developed, over the phone, Luise, is that which you see in the program for tonight. We didn't realize you might think we were expanding your topic. We were trying to find something that would fit all occasions. That's always the political thing to do, right?

It's important for us to have this background and perspective as it relates to all the discussions we're going to have during the conference. Happenings in Washington have great impact on what we researchers all around the country can do, not only in monetary terms but also in terms of the total support system that needs to develop in a research area.

NUTRITION EDUCATION RESEARCH: PERSPECTIVES AND DIRECTIONS

Barbara Shannon and Susan Oace

Judy Brun:

The committee felt it was important for us to have another perspective from those who have been working closely with the literature in this particular field for the last few years. All of us who are familiar with the Journal of Nutrition Education know that the focus of articles, the editorial policies, and the kinds of things that have been appearing in that Journal for the last two or three years are very different from the things that were in the Journal when it was first established some ten or twelve years ago. So we did some thinking about how we would use the valuable insight those people have to provide further foundations for our work. We talked with Sue Oace, who is the current editor of the Journal of Nutrition Education, and Barbara Shannon, who is to become editor of the Journal. They have collaborated upon a presentation for tonight. I'll turn now to Barbara Shannon of Penn State University.

Barbara Shannon:

As Judy told you, when the planning committee came together and identified this area, it was obvious Sue would be the most appropriate person to address this perspective because she has had a long career with the Journal and has been in a position to take an objective view. She was asked to make a presentation but was unable to come. So Judy turned to me as incoming editor of the Journal. My feeling was that my efforts have been concentrated in a fairly narrow area of nutrition education research. Moreover, the manuscripts I have reviewed, as a member of the Journal of Nutrition Education editorial board, have usually been limited more or less to that particular research area. Thus, I did not feel that I had the broad perspective needed to make this presentation. Consequently I asked Sue if she would be agreeable to writing some comments that would give you her perspective and I would provide a follow-up to those comments. She was very gracious in agreeing to do this and has written a very provocative paper for me to present. I am going to be sticking to her script fairly closely because I want to convey Sue's feelings on this. Then I will move on to a follow-up of my own. But anyway, we'll get there.

Sue's speaking first, so right now I'm wearing Sue's hat.

Statement by Susan Oace:

From my viewpoint as the editor of the Journal of Nutrition Education, I can see trends in the types of manuscripts submitted as well as changes in the expectation of reviewers, that is, in what they

consider publishable. What is missing from my perspective, however, is a body of nutrition education research that either is not offered for publication or is published in other research journals in related fields. Nonetheless, assuming that trends in our journal reflect changes in the field, I will share some observations about this admittedly limited sample.

A major problem with nutrition education seems to be our lack of focus or agreed-upon conceptual framework. This fuzziness is reflected in nutrition education research. For comparison, nutrition science does not have the same problem. Discovery of the nutrients and their functional requirements, interactions and effects are matters of fact and are not value-laden. Certainly controversies do exist, such as fluoridation, diet and heart disease, sugar and hyperactivity, dietary fiber, just to name a few. But the arguments are over interpretation and implications and not over the data base itself. One has the comfortable feeling that the matters of fact will be resolved with further collection and analysis of information and testing of hypotheses. Differences of opinion with respect to application of nutrition science may continue but these differences will be in the domain of nutrition education policy and not in basic fact.

Possibly because of the lack of any organized framework, I do not have the same comfortable feeling about the eventual resolution of nutrition education fact through nutrition education research. In many cases methods of collecting and analyzing data have become quite sophisticated, but because research efforts are designed independently, without consideration of a common goal or set of questions, results from several studies do not build toward a unifying concept or theory. I will offer examples from overlapping areas of food behavior, food guidance and evaluation of nutrition education programs for children. I do not mean to limit the field to these topics, but I have chosen them as examples which encompass the work of large segments of persons who consider themselves nutrition educators. I have also chosen them because they are topics which most of us would agree belong under the rubric of nutrition education.

I consider "food behavior" to include the description, comparison and evaluation of food selection and eating patterns of various groups of people and the investigation of determinants of such behavior. Research in this area includes "culture and foods," which for many years has been little more than a description of bizarre or unique food choices -- insects, objectionable parts of animals, taboos, special-occasion foods, oral injection of non-foods and the like. Usually such descriptive information does not lead to a feeling for the nutritional adequacy of the total diet or even to what the total diet looks like. Food behavior research may also include quantification of nutrient (or food) consumption by various arbitrary groups. In such cases, rarely is the homogeneity or the usefulness of the "groups" assessed. In other words, are age, sex, race, geographic location and economic bracket the meaningful group characteristics by which we should describe people in order to define target groups, particularly groups at nutritional risk? Presumably we nutrition educators need these groups to guide the development of educational programs for improvement of

nutritional status of group members so we may measure progress toward our objectives.

Perhaps it would be more useful to group people by what they read, where they shop, whom they believer, their views on environmental issues or their views on technology. Some nutrition education researchers are beginning to characterize determinants of nutrition knowledge along these lines and some are investigating eating patterns rather than nutrient intakes. However, such investigations are carried out largely without an organizing framework or common conceptual basis. Studies that purport to report determinants of food behavior rarely determine more than correlation coefficients between arbitrary characteristics of people and their diets.

Food behavior research generates descriptions, opinions and, if one uses the term loosely, hypotheses. Hypothesis testing is a rarity. But important researchable questions do exist. How do people, individuals or groups, view food -- in its entirety or as individual food items? Is food linked with health, survival, status, comfort, social life, religion or something else or a combination of these? How should we report food behavior? Should we do it by itemization and quantification of food items? Of nutrients consumed in terms of nutrient density? Protein sources? Simple or complex carbohydrates? Polyunsaturated to saturated fat ratios? Cost per unit? Percent of "requirements?" Cost of the total diet? Distribution among family members? How do we characterize people or groups? By age? Sex? Race? National origin? By income? Rural/urban? Education? The meaning of food? Nutrition knowledge?

What I am trying to get at is that in the general area of food behavior we have not even come close to agreeing on measurable units or categories for comparison or study. We cannot even begin to assess change, to measure impact of education or policy or advertising or land use, to conduct comparison of groups or assess "adequacy" of food choices unless we develop some methodologies for collection and reporting of our data. I suggest that only when we know how healthy a person or group wants to be can we determine whether or not the food behaviors are consistent or inconsistent with "health." Only when we know how important economic factors are can we determine whether or not food is too expensive for one group in comparison to another. Only when we establish the homogeneity of the "group" can we legitimately use "averages" for comparisons with other groups.

Moving to the areas of food guidance, there has been a fairly recent trend -- largely due to issues raised by public and professional debates over Dietary Goals -- toward the development of a number of new systems for advising people what to eat. However, food data research is nearly nonexistent. In this case, nutrition scientists who stray into the "advice to the public" domain are at least as much to blame as are those who identify themselves primarily as nutrition educators. But, in any event, despite the extraordinary debates that are raging vis-a-vis food groups, goals, nutrition scores, nutrition density, the RDA, the USRDA, labeling information and the like, little in the way of research supports any of these systems. Two types of research are necessary.

First, we must establish whether or not the guidance system meets nutrient goals or are some special "side rules" needed to assure, for example, adequate zinc, moderate sodium or desirable polyunsaturated-to-saturated fat ratios? Parenthetically, I am assuming that we can agree on what the nutrient goals should be! Some studies of this type have been carried out with respect to the four food groups. Mainly the results lead one to question the nutritional accuracy of this system of food guidance despite its over twenty years of use.

A second research question with respect to food guidance is whether or not a system is meaningful and useful to its intended audience. And whether or not a new system is as good as or more effective than an existing one. We can argue about the theoretical failings or inadequacies of a simple food guide but, in the end, a simple but inaccurate system that achieves some of its objectives is superior to a complex, accurate system that achieves none of its objectives. We must determine the marginal gain (or loss) associated with increasing complexity of the food guidance system. And critical to the question of effectiveness of a system is establishing well-defined criteria for what a food guide should achieve. As long as nutrition professionals continue to disagree about the definition of desirable food behavior we are likely to continue to disagree about criteria for food guidance systems.

Again we return to the problem of conceptual framework. In the case of food guidance we seem to have too many concepts -- avoidance of deficiencies, avoidance of excess, environmental concerns, economic concerns of consumers and producers and so on. In the end, too many concepts can be just as devastating to coordinated research efforts as is the lack of a conceptual framework.

Finally, some comments on evaluation of research trends within the context of nutrition education in schools. Great strides have been made in this area in the past few years, largely due to an infusion of funding through the federal Nutrition Education and Training program and the advent of computerized statistics packages. Nutrition educators have formed collaborative research groups with cognitive psychologists, education evaluation researchers and statistics and research design professionals in developing valid and reliable test instruments and experimental design protocols. In many cases nutrition education has offered these allied professionals interesting new areas in which to test their theories and apply their instrumentation methodologies. In turn, nutrition educators have gained quantitative and qualitative evaluation methodologies for measuring effectiveness of nutrition education efforts.

At first glance this appears to be progress and certainly there are some benefits. However, there are also some problems. Statistical significance does not necessarily signify practical importance and a valid and reliable testing instrument does not necessarily guarantee that the items are worth testing. In many cases extraordinary time and energy are devoted to the development to "items" for nutrition knowledge tests when monitoring the disappearance of candy bars and oranges or milk and soda from the snack machine might provide a more meaningful measure of effectiveness of nutrition education. I'm concerned that

nutrition education researchers are falling into a trap in order to prove their legitimacy as researchers. We are incorporating the methodologies of other fields without first establishing their usefulness and relevance in our own field.

Again, the problem relates to a large extent to defining a conceptual framework. It stands to reason that if we are hazy about how to describe or quantify food behavior, we are also going to have a hard time measuring the effects of nutrition education which presumably is intended to change food behaviors toward conformity to a food guidance system.

Of course, one way of avoiding the problem associated with measuring food behavior and characterizing the optimal diet is to ignore behavior and measure nutrition knowledge instead. We all agree on food sources of vitamin C and the effects of a vitamin-A deficiency. The facts associated with nutrition knowledge are non-controversial, the tests can be developed with methods accepted by cognitive pyschologists, and the significance can be determined by a sophisticated computer package. This approach is very safe but in the long run does it provide the information we really seek?

A few nutrition education researchers are investigating the relationship between nutrition knowledge and food behavior or the willingness to change food behavior. Hopefully such programs will expand to incorporate other characteristics of people and will attract funding and collaboration with other professional fields such as medicine, sociology and anthropology to name a few. Hopefully such programs will expand beyond description and correlation into testable hypotheses. Hopefully such hypotheses will eventually become the conceptual framework that is needed so badly to organize and focus nutrition education research.

In the meantime I would urge nutrition educators to continue to broaden collaborative efforts and to learn through the methodologies of other disciplines, but to proceed with caution. The problems related to nutrition education are unique and may require unique approaches for resolution. Unquestioning reliance on the tools of other disciplines, whether it be nutritional biochemistry or cognitive psychology or statistics, may lead to dead ends or meaningless findings. We need to develop our own methodologies and our own conceptual frameworks.

Barbara Shannon:

As I contemplated a follow-up to Sue's comments, I attempted to distill out, in a few sentences, my perceptions of her message. It seems to me that from her perspective, nutrition education research is proceeding in a disorganized, unsystematic manner that precludes the building of a data base from which we can develop concepts. I'm using the term concept, simply to mean ideas or notions generalized from observation; in this case, observations from research studies. Thus it seems to me that Sue is saying our research is not generating a coherent pattern of concepts, that is, a conceptual framework. Without this conceptual framework it is difficult to generate the broad theories that

we need, and without the broad theories it is difficult to generate guiding principles. Without the guiding principles nutrition education endeavors are likely to be based largely on guesswork. If Sue is right, and I certainly think she has some very good arguments, the first mandate is to bring the whole of nutrition education research into a more organized and systematized mode, i.e., a functioning arrangement.

This certainly is not a task for one person; it will take many very astute minds. But I'm willing to make a few suggestions for purposes of discussion. What I will attempt to do is to simply tell you how I have organized my thinking in terms of nutrition education research and you can decide whether that might serve as a starting point for discussion.

Since Sue has referred to nutrition science research, I'm going to use that as my reference. As we look back over the history of nutrition science research, is there evidence of organization? I think there is. Initially the fundamental components of nutrition, the nutrients, were identified; then they were characterized and described. Once that was under way a study of function proceeded with emphasis, in the early years, on function in prevention of deficiency symptoms and disease. Now the focus is on how the nutrients interrelate at the molecular level to produce the desired outcome of health and well-being. In tandem with that sequence the quantitative requirements for each nutrient were studied and the food sources were identified. So now we have a data base of the depth and the breadth that allow both teaching and research in nutrition science to be conceptual in nature, <u>not</u> just a body of disconnected and unrelated studies.

To use this overview for purposes of analogy the fundamental components of nutrition education must be identified. I'm proposing for purposes of discussion that these components are:

- the people to whom nutrition education is addressed
- the message or messages
- the process of conveying the message to the people, i.e., the education process
- the outcome of the process.

Having identified the components, my analogy calls for their characterization or description and then studies of how the first three -- the people, the message and the process -- interrelate for the accomplishment of the last, the desired outcomes.

Sue's contention is that we have not adequately characterized and described these components for purposes of nutrition education research. She points out the such traditional descriptors as age, sex, race, and economic bracket may not be the most meaningful way to characterize the first component, i.e., the people. She further argues that our food guide messages have not been adequately studied, defined or characterized in regard to the objective of meeting nutrient needs, or in regard to their meaningfulness to the intended audience. Is that the case of other nutrition education messages?

As to the process of educating our target audiences, we do have a substantial data base from educational and psycho-social research upon which we can draw. But Sue raised a very provocative question when she asked whether we are incorporating those methodologies and techniques from other fields without first establishing their usefulness and relevance to our own field. For example, can we assume that the techniques that have proven most effective in teaching cognitive skills to third-graders children are also the most effective educational techniques for teaching them an appreciation of a wide variety of foods?

The last of may suggested components of nutrition education, the outcomes, may be cognitive in nature such as knowledge, affective such as hemoglobin concentration, or they may be any combination of these. Sue has questioned whether or not we have adequately described and characterized these outcomes from the perspective of what we want to accomplish through our nutrition education efforts.

If these indictments are indicative of the situation in nutrition education research, we have to conclude that we are working in a poorly defined area. In spite of this, many investigators (myself included) have proceeded to conduct studies aimed at assessing nutrition education programs. I'm going to offer some defense for that in just a moment. Suffice it to say right now that these studies often do not build on each other nor do coherent patterns emerge, so we have difficulty deriving a conceptual framework.

This perspective that Sue and I have presented is, to say the least, critical. Let me present the flip side of that. It is mandatory that we look critically at our work and identify our weaknesses but we must not fall into the trap of equating our quality and sophistication as nutrition education researchers with our ability to be critical of that research. We must be able to see those weaknesses in perspective and in context with the evolving nature of research area. And we must recognize strengths in our research and encourage progress. If all we do is sit around and criticize ourselves, we are not going to get anywhere.

Sue and I have nutrition science research for purposes of comparison and analogy. But when I summarized that research area from a historical viewpoint, I did it in very broad brush strokes. When we do that we are able to see overall trends and developmental processes that I seriously doubt were apparent to researchers when they were doing the work on a daily basis. When Lind did his famous study with limes and English sailors, I rather doubt that he followed a protocol which had as its objective the identification of a fundamental component of nutrition. He was dead by the time an organizing framework for vitamin research fell into place. And even when that framework was fairly clear, researchers did not wait until a newly identified vitamin was fully characterized before they started to test its efficacy in improving health. They could not afford to wait, any more than we in nutrition education could afford to delay our efforts when funds were allocated by the federal government for nutrition education in schools.

That is the defense I promised you. Certainly we lacked a lot of badly needed descriptive data in our work at Penn State, but we had to

go ahead. We had to get the programs in place and we had to carry out some studies to test the effectiveness of those programs. Certainly there are many valid criticisms of those studies and we need to attend to those criticisms. But some very valuable findings also came out of those studies and we must likewise recognize and attend to those findings.

What I am trying to say is that in human endeavors things seldom proceed in an orderly, well-planned fashion. Nutrition education is no exception. It is a human endeavor. In my opinion, and this is my opinion, we need not apologize for or feel ashamed of the current status of nutrition education research, but neither should we feel smug. We fall far short of excellence. If we are to move toward excellence I believe emphasis should be placed on the following three things in the immediate future:

1. We need to articulate an organizing framework for nutrition education research. (I am not using the term conceptual. You may take issue with me on this, but I think we have to organize our thinking and build studies that develop a stronger data base before we are at the point where a conceptual framework will fall into place. That is an issue you can discuss at this conference.)

2. We need to design and execute nutrition education studies that build on each other and on relevant published research.

3. We need to encourage funding sources to allocate funds so as to promote ongoing research programs that can incorporate sequential studies.

This is my fourth conference on nutrition education research in the last three years. Many of you have attended those four and others, besides. In all of these we have voiced a need for some kind of framework that will promote more systematic research. I think it is time we get on with the task. I propose that we start with a simple, fairly short position-type paper providing an organized overview of nutrition education research. This overview will allow individual researchers to see their research studies and their research interests in the context of the whole and to design studies that will contribute to the formation of a coherent data base from which, in time, guiding principles can be derived.

If our research studies are going to build on each other and contribute to this coherent data base, we need funding that is secure enough to undergird stable, ongoing research programs. We cannot be forced to chase dollars on a year-to-year basis so that we have to constantly shift our research emphasis to fit the most current request for proposal (RFP). Unfortunately this is much easier said than done and our control over the situation is often very minimal. Nonetheless, it is important to call to your attention the extreme importance of this issue which is so critical to the future vitality and strength of nutrition research.

What I presented is opinion, mine and Sue's, and it certainly is not sacred. It may not even be true, at least not all of it. But it's worth thinking about. I appreciate your attention. Thank you.

Question-and-Answer Session

Question:

I wonder if you would speak to the difficulties of premature theory building. Isn't it too early?

Barbara Shannon:

You are asking if it is too early to start establishing and testing theory? Is that what you are asking? It seems to me that we need to spend quite a bit of time describing and characterizing the components of our field. If we propose theories before we have a substantial amount of observation that builds toward cohesive ideas, we are likely to propose a theory that could take us into the area of dogma and maybe into a hundred years of chasing the wrong kind of thing. It seems to me that most disciplines have a period of constructive and productive muddling out of which frameworks eventually begin to fall in place. They then move on to theory testing, good conceptual frameworks and good guiding principles. That is the reason I refuse to be so critical of our field. We have to allow ourselves some period of time to "muddle," and I think we are moving through that period now. It's time soon, to go beyond muddling and to bring some organization to the field that will work toward building a conceptual framework.

NUTRITION EDUCATION RESEARCH: FOCUS FROM PREVIOUS CONFERENCES

Laura Sims

Judy Brun:

Another perspective that we wanted to provide for you before the next two days' sessions is a quick look at some of the conferences that have preceded this one in nutrition education research. Barbara just said that many of us have been at all the others. That is true; many of us have. And want to be sure we don't repeat ourselves. We must go forward from the progress made at them.

We had asked Ardyth Gillespie to talk some about the Cornell meeting, but because of illness she is unable to be with us this evening. In your packet, however, you do have the excerpts from the Journal of Nutrition Education supplement that published the proceedings of this particular conference (JNE 13:Sup. 1, 1981). As your bedtime reading tonight you may want to skim through that again. There seem to be some things there that suggest an approach to the conceptual framework for nutrition education research. If you see what I think I saw, relate it to the four fundamental components of nutrition education that Barbara Shannon just mentioned. I think they fit together to some extent.

The other conferences in which many of you in this room participated last year, (there were five of these working sessions) were held at Penn State. Laura Sims and Luise Light coordinated them. Laura has been developing the proceedings of those five working conferences in terms of what they say are needs for nutrition education research, what the research questions are that need our attention. She and Luise worked very hard getting the five groups together, identifying a broad range of people who would make contributions in the various areas. Lately some of you who were at those conferences have received mailings from Laura saying, "Please read and react quickly!" We are going to hear from Laura tonight about what happened in all the sessions. Each of us who was there only participated in one of them and we need the whole picture. Please help us with that, Laura.

Laura Sims:

After reviewing the list of invited participants to this conference, I, too, was astounded that over half of you had attended at least one of the five Penn State working panels held last year. I am pleased to report to you tonight on the "preliminary" conclusions from those meetings.

In keeping with my charge, I would like to review for you briefly tonight the background and the procedures which were followed for the Penn State conferences. I have prepared a summary handout and will review with you the preliminary research issues and priorities which emanated (See Appendix on page 29) from each panel. Finally, I will share with you my thoughts about the various themes that emerged from the five conferences and hopefully stimulate some discussion which we can pursue together in the following two days.

Background

Primarily because of Luise Light's persistence and foresight, a contract was awarded to Penn State in June, 1980 by what was formerly the USDA Human Nutrition Center in Science and Education Administration to convene four working panels composed of experts from across the nation. They were to meet, discuss and arrive at actionable research priorities for nutrition education research. Each working panel was directed to focus on a single topic and describe the range of current issues as well as arrive at priorities for research efforts, which hopefully -- and at that time we were very optimistic about it -- would receive USDA funding.

The four conferences originally funded were in the areas of 1) eating patterns, 2) nutrition communications, 3) formal nutrition education, and 4) community or non-formal nutrition education. A fifth topic of evaluation research in nutrition education was jointly agreed upon and subsequently funded as a fifth conference. The names of expert panelists in each of the five areas were mutually agreed upon and prospective panelists were contacted to determine whether they could attend the conference on specified dates. Prior to each conference each participant was sent a packet that included an agenda for the two days, a listing of the other participants and a paper in which each participant was to report his or her understanding of the current "state-of-the art" as it existed for that research area. Several publications and articles were also sent to stimulate thinking about the area and to focus on previous research efforts. A select annotated bibliography was prepared as was a list of priorities for research in that area that had been derived from a variety of other kinds of publications. Each conference was planned to last approximately a day and a half and the meetings were held on the Penn State campus. All of you who attended can mutually attest that it is truly the place that is "equally inaccessible from all points!"

The first session consisted primarily of a discussion by each of the participants about his or her own interests and areas of expertise relative to that topic area. The first day's session was designed to focus primarily on the definition of past and current research. After dinner the group was subdivided into several small groups for discussion to further refine the thinking about current efforts.

The second full day was spent examining present research in the area and trying to focus on future research directions and priorities. Opportunities were provided to gather information from the respondents by means of full group discussion, small group discussions individual elicitation of research issues and priorities, and feedback among the panelists. Each panel was asked to submit written comments about views regarding the topics. These remarks were recorded on colored sheets for my review and use in preparing the proceedings.

Because of the vague and non-generalizable nature of previously generated research priority lists, panelists were charged to become specific and focused so as to assist the USDA staff in defining nutrition education research topics for future funding. Each panelist was asked to examine research in his or her field, indicate what is

currently known and accepted versus what is needed to be known in order to reach consensus about the research goals. Criteria by which each of the elicited research priorities were to be judged included: 1), being specific and researchable; 2) designed to make a definite contribution in terms of impact and importance to knowledge in the area; and 3) having social significance in terms of long-term results for the nation's health.

I would like you to turn your attention now to the handout you have received (see Appendix at end of this paper on page 29). I'm not going to read these verbatim, but I would like to focus on what I saw as some of the major themes and directions of each of the panels.

The first panel dealt with the topic, "eating patterns. Those who attended this group were drawn from a very wide array of disciplines -- anthropology, epidemiology, psychology, medicine, nutrition, experimental psychology. The interesting thing about this group was that, because they came from such diverse backgrounds, we soon learned that terminology was of major importance. We realized that we didn't know what other persons were talking about -- what were "food patterns" to one might have been "eating habits" to another. So we developed a glossary of "working definitions," primarily for our own use in of trying to gain a common basis of understanding. The terminology issue, I would say, was the predominant one pervading the first conference, preceding even the methodology issues. This group, in particular, felt that we needed some kind of scholarly, descriptive research looking at how people themselves define what it is and how it is they eat. Panelists in Group I called for more theory-building research, rather than hypothesis-testing research. Development of methodology was also of utmost importance. Panelists wanted to know: how do people use food; how do we collect this information; how can we be assured that the information that we collect about dietary intake is valid and reliable; and how can we quantify or measure diets in order to get some kind of standard for judgment?

The second panel, on "nutrition communications," focused on a theme that, interestingly enough, crossed all the remaining panels. (I hadn't predicted that would happen.) This group also was composed of a variety of experts -- advertising executives, cognitive psychologists, social psychologists, nutrition researchers. The panelists felt that we didn't know enough about marketing and consumer research methods which could be adapted for use in the nutrition communication research area. We don't yet know, they believed, how to integrate communication techniques with methodologies for assessing whether the desired behaviors had actually resulted. Again, methodology issues seemed to predominate as an area of concern for this particular panel. In terms of priorities, this panel suggested also a need for a scholarly review and critique of what we already know, pulling this together into a synthesis or compendium. This panel also suggested looking at fairly small-scale studies and then combining these results so that we could derive some conceptual frameworks for our work.

The third panel was on "formal nutrition education. This particular panel seemed to address the task more directly and with less difficulty than the others; perhaps part of the reason for this was that we knew each other so well. The communication barriers were not quite as much of a problem and the group itself seemed to grasp the issues and know where it wanted to go with the theme. The panel examined specific areas: 1) the school as a nutrition education environment, 2) characteristics of the child as nutrition learner, 3) characteristics of teachers and teaching techniques, and 4) characteristics and types of curricula. Panelists also wanted to examine how the school interfaced with the broad environment, particularly with the family and with other community agencies. Again, the priorities were for review and synthesis and for refinement of methodologies.

The fourth panel dealt with "community or "non-formal nutrition education," those nutrition education efforts outside the formalized school setting. Many of the themes which emerged from this panel were very consistent with many of the things said in Panel II. The problem statements for the community dealt primarily with the context of the community surrounding nutrition education programs. How is this different. What is unique about it? What we can do to capitalize on some of these unique characteristics? What are some of the means by which nutrition education efforts are conducted in the community? This group was very concerned with evaluation issues, overlapping panel V's charge. Panelists were concerned about examining assessment issues and research strategies that might emanate from the target or client group rather than about using a research design superimposed by the researchers themselves.

The fifth panel was on "evaluation research" and again was derived from a variety of professional disciplines -- professional evaluation experts as well as nutrition education researchers who were concerned about these issues. In terms of problem definition, these panelists asked: What do we expect from evaluation research and how is this different from "program evaluation?" Is the purpose of evaluation one of rendering a judgment, i.e., is the program good or bad, or is it one of providing decision-makers with information so that they can improve the program operation and design? Panelists suggested an appropriate need for both. Panelists voiced a need for standardized instrumentation and a commonly agreed-upon set of criteria for what it is we want to achieve. This group also felt that we needed a comprehensive review of our efforts, identifying effective elements and emphasizing those elements in our research efforts.

Personal Reflections

Despite the fact that each panel had its own "personality," several recurrent themes developed across the five panels. Some relate to substantial conceptual or methodological issues while others are in the category of what I'd call "research philosophy." The themes that emerged from the several panels about conceptual issues suggest an inherent common ground for those of us involved in nutrition education research. Essentially, panelists felt that there

should be more focus on identifying characteristics of the target audience and seeking their views about the educational intervention before it is designed so that it could be more relevant to their needs and hopefully more "successful" in our record books.

Panelists voiced concern that rarely was sufficient attention given to the mix or the interface among the characteristics of: 1) the message, 2) the receivers or clients, 3) the educator or teacher and 4) the environment or context in which the program took place.

Another often repeated theme was the call for more multi-disciplinary collaborative studies. One panelist went so far as say that he felt no federal funding should be used for any single-discipline studies. This sentiment apparently was felt by those who believed that nutrition education can learn from the strengths, successes and failures of related disciplines in cooperative research endeavors.

Another need was for more funds to support scholarly reviews of published literature in nutrition education and related fields. These reviews were described compendia including synthesis, review and critique of completed studies. This effort would, as one panelist put it, keep us from "reinventing the wheel every time a new federal Request for Proposal was issued."

Panelists returned in every session to the methodological difficulties with which we are all faced. They felt that more standardized instrumentation and substantive methodologies and language for measuring consumption, knowledge and attitudes should be available. These methodological concerns and issues were raised so frequently that I believe they can be taken as a strong mandate for future nutrition education research efforts.

Finally, several areas of common frustration emerged that I shall label, for want of a more appropriate term, "research philosophy" issues. A strong sentiment expressed was that more time and effort should be spent on what was called "theory building research" rather than on hypothesis-testing research. Panelists felt that the more explorative descriptive research would lead to richer results, i.e., being then able to ask the "right questions" in the first place rather than to attach numbers to "meaningless questions." The exception to this thrust was in Panel III, Formal Nutrition Education. Members felt that both types of research were necessary and should be carried out in somewhat comparable proportions. Other panelists brought forth the issue of whether we as nutrition education researchers have been guilty of having unrealistic expectations for the results of our various programs or campaigns. Advertising researchers, we were reminded, measure success in terms of 1-2% swing in consumers' purchase patterns, while we continually reach out for and feel as though we have failed when we reach only 10 or 20 percent change in the behavior of our client or target audience. Do we need to change our standards or expectations for success? Should we continually strive for behavior change or instead be content when we achieve

moderate to impressive changes only in nutrition knowledge and attitudes? Should we sometimes be pleased that we are able to maintain curent behaviors?

One disturbing thought continually reoccurs to me. As a researcher I support the cries for more multidisciplinary theory--building research in nutrition education but, as one who has experienced both the pain and the exhilaration of such collaborative endeavors, I realize how very costly in terms of resources these projects can be. If we are to ask that more such research be supported at the federal level, the need for stable funding and competent selection and monitoring procedures becomes of utmost importance.

The outcome of many of these discussions seemed to be a call for fewer short-term, single-issue projects and more multi-year, multi-objective designs. This theme has prompted me to wonder whether we have been viewed as being too simplistic and piecemeal in our past efforts. Since most of us are in the academic community, have we responded to the more immediate pressures of the "publish or perish" syndrome? Have we answered questions with limited resources and less than highly trained skilled manpower in order to get quick answers to short-term questions? We need to consider how we can more effectively break down broad research issues into more finite, but interrelated, research topics.

My report tonight obviously fails to capture the richness of the discussions from the panels composed of articulate scholars and researchers. You may feel that these summary comments are overly generalized and non-specific. I hope, however, that the report will stimulate researchers to think about the issues more specifically. I personally believe that we in nutrition education research have recently come a long way. We have learned from other disciplines and adapted their methodology, concepts and techniques. We have contributed knowledge of our own. We must continue to refine our research questions, choose the most appropriate instruments for data collection, accurately analyze and interprete data, and draw meaningful conclusions from our results.

Thank you.

Question-and-Answer Session

Judy Brun:

Thank you very much, Laura, for giving us this perspective. I said earlier that our focus is looking at strategies for theory building but that I was certain we would get into related issues. For example, there do appear to be conceptual frameworks for the field that need to be clearly identified. Political issues to be identified and arbitrated. Funding for research is, in many senses, a political issue; we need a determination of what is valued, and of where resources are to be used. It seems to me that a field of research, whether it is nutrition education or biochemistry or physics or whatever, cannot progress as it should without a formal, solid base of support for that research.

I haven't given an opportunity earlier for questions. Do you have a question you would like to direct Laura?

Question:

I would also like to ask Laura to respond to the question I asked earlier of Dr. Shannon, the difficulties of premature theory-building.

Laura Sims:

Some of the papers we used for advanced reading were interesting because they talked about taking some elements and weaving them together into a cohesive whole. I was struck by the repetitive nature of this call for theory-building in the Penn State meetings. However, I'm not sure people knew truly what was meant by "theory building." Most of us were trained as empirical nutrition science researchers. We know how to count physical effects or measure results. To move out of that arena to a broader less quantitative analysis makes many of us uneasy. But, because we have so many people giving attention to theory building, I think we might use conferences like this to make a start. One of the positive things I saw was a cry for a published synthesis or a compendium of previous research studies. When I start a new project I try to get an idea of what has been done before. But if we could have a common resource from which to work we could then develop something that might be more cohesive and meaningful.

Appendix

The 1980 Penn State Nutrition Education Research Conferences Preliminary Consensus and Implications

Panel I: Eating Patterns

I. Major Research Issues

A. Descriptive research on topic of "what and how people eat."
B. Analytic approach for discerning those factors most influential on food choices, relative importance of each and potential for change in influencing these, particularly applicable for studying the developmental acquisition of food-related behaviors.
C. Experimental research - determining areas for intervention in changing eating patterns.

II. Priorities

A. Integrative, cross-disciplinary and collaborative approaches to study of eating patterns needed.
B. Development of a critical, systematic review of literature across professional and disciplines studying eating patterns to focus on various descriptive models, factors affecting food use, and methodology available to study food use behavior.
C. Support descriptive research leading to "theory building" rather than "hypothesis testing."
D. Development of methodologies:
   1) Procuring validated "food use" data
   2) Sampling procedures for theory building
   3) Developing means by which to quantify or measure diets against selected nutritional standards.

Panel II: Nutrition Communications

I. Research Issues

A. Need to better define/understand the target audience (receivers) to whom nutrition-related communications are directed (what is appropriate level of market segmentation?)
B. Better understanding of program intervention characteristics in order to maximize behavior change among target audience.
C. Need to document and evaluate effectiveness of various intervention strategies, and their components (messages, formats, location of delivery, etc.).

II. Priorities

A. Need for scholarly review and critique of the literature, focusing on nutrition education issues with relevance to communication, research methodologies and models, and

compendium of methods, strategies with review of their effectiveness

B. Examination of methodologies from related areas and application of those deemed most relevant to nutrition communications issues

C. Support for small-scale, comprehensive program intervention studies based on sound theoretical and conceptual frameworks.

Panel III: Formal Nutrition Education

I. Research Issues

A. Characteristics of "Child as Nutrition Learner" --are children in school setting at a time and for long enough for eating patterns to actually be modified/influenced by formal education?

B. Characteristics and training of nutrition teacher educator: characteristics interface with school environment and curriculum content; competencies needed.

C. School as learning environment: interface with home and community systems.

D. Curriculum methods and content: what basic information must a child be taught in order for him/her to make informed food choices?

II. Priorities

A. Need for systematic review and synthesis of the literature.

B. Define appropriate conceptual frameworks and methodologies

1) Identify characteristics of successful school-based programs

2) Systematically examine these programs to determine those factors which have influenced an agreed-upon set of outcome criteria.

Panel IV: Community (Non-formal) Nutrition Education

I. Research Issues

A. Need for better assessment of factors affecting individuals' various nutrition-related behaviors and motivations before intervention is begun.

B. Refinement of implementation strategies in community nutrition education--dealing with content of the message, target audience characteristics, and methods for disseminating nutrition information.

C. Documenting and evaluating community nutrition education efforts--how much change is necessary to claim "success?"

D. Characteristics of communication nutrition educators - need for community organization and advocacy skills.

II. Priorities

A. Attention to assessment issues in terms of attention to characteristics of target audience as baseline on which to design program.
B. Attention to methodology issues in terms of instrument design and use.
C. Research strategies need to be strengthened.
   1) Design interventions which enhance social support systems
   2) Combine ethnographic approaches with planned program interventions.
D. Use of community nutrition education research results to maximize environmental changes and policy outcomes.

Panel V: Evaluation Research in Nutrition Education

I. Research Issues

A. Definition and explication of a research model/principles by which nutrition education could be approached and evaluated from the most specific program example to more generalizable situations.
B. Given issues dealing with food availability, governmental regulation and types of information disseminated from various sources, what kinds of and how much information are necessary in order for individuals to make informed choices about food use?
C. Need for more common set of measures/instruments, including tools for evaluating dietary status, inventory of nutrition education instrumentation and standards, quantifiable, time-sensitive indicators of behavioral change.

II. Priorities

A. Evaluation research efforts should be included as a mandated component of all newly funded federal nutrition programs.
B. Need for more definitive baseline information about the nutritional/dietary status of the American population.
C. Emphasis on funding population-based, community-level intervention programs as fruitful area for evaluation research.
D. Need for comprehensive review ("meta-analysis") of efforts and results of nutrition program evaluations.

THEORY AND MODEL BUILDING

Herbert J. Walberg

Jerome Bruner, a famous educational psychologist, says that people learn in three ways: verbally, through pictures or iconic representations or graphs, and mathematically. In dealing with theory I'd like to use all three of these approaches and have placed before you three papers which will help me to do this.

I'd also like to say, by way of preface, that I share the view of Karl Popper, the English philosopher, on the role of theory in research--both physical science research and social science research. The role of theory, in my view, is to make laws or presumed laws explicit. Instead of having vague formulations or opinions, theory identifies constructs and the relationships among these constructs.

The real purpose of theory is to have something explicit that can be falsified. Theory is that which we can use empirical data to destroy. There is, therefore, an interactive relationship between theory construction and data collection. We design the best test we possibly can to falsify theories. Those theories that are enduring, that have survived a great number of tests, are those that we can elevate to some greater status.

The three papers I have placed before you might be useful in thinking about the subject of nutrition education theory building. They represent three different approaches to theory development.

The first paper (1) represents the approach that there may be implicit theories in practice. We can induce a theory or we can operationalize a theory from what practitioners are doing. We have a great obligation in theory building to base what we do on what other scholars have done. Therein lies a fault of much of educational research. We haven't looked carefully at the literature or listened to our colleagues who are working in the field. The first paper represents this approach in the field of open education.

The second paper (2) represents an attempt at taxonomic theory development, that is, an identification of categories of theory that are implicit in instructional practice and techniques. By classification in a systematic way, one can make explicit a great number of hypotheses. These then become subject to falsification tests through research to see if they hold or if one is superior to another.

The third paper (3) is an exemplification of mathematical models that draw very explicit representations of independent variables to dependent variables to develop theories. This third paper, using the concept of educational productivity as an illustration, draws heavily on the field of economics and also on psychology. It attacks the problem of scarce resources in education and of identifying those educational treatments that will produce greatest learning at minimal cost, particularly human cost in terms of student time and teacher time.

Operational Theory Induced from Practice

Let us turn, then, to the first paper, "An Analytic Review of the Literature." Open education was imported from England about 15 years ago to the east coast of the United States and created a great deal of controversy. It seemed to require an operational definition. One role of research in helping practitioners is development of operational definition. The obligation was not to define it arbitrarily but to carefully examine, through content analysis, the writings of practitioners in England and the United States.

These were not research reports but rather writings of practitioners attempting to describe how their work had evolved over decades of effort in England and the United States. By the time the idea got to the midwest, it had come to suggest a physically large classroom, behavioral objectives and competency testing--all of which were antitheses of the original open education concept. It was perhaps possible to develop an operational definition by going directly to the writings of the practitioners as a first step.

What emerged from these writings is the idea of cooperative planning of teacher and student together. This is what the original open educators were trying to accomplish. What I'm trying to illustrate here is that the presence or absence of theory and operational definition can be decisive in whether an educational movement is successful or not.

Now let us go back to the procedures we used in conducting a very thorough content analysis of this literature. We identified eight themes of open education that seemed to be highly pervasive in those writings: 1) Instruction--guidance and extension of learning, 2) Provisioning--the classroom for learning, 3) Diagnosis--of learning events, 4) Evaluation--of diagnostic information, 5) Humaneness--respect, openness, and warmth, 6) Seeking--opportunities to promote growth, 7) Self-perception--of the teacher, 8) Assumptions--ideas about children and the process of learning.

We also identified four types of groups who had been writing on the practice of open education. There were reporters, researchers or analysts, advocates, and practitioners whose writings needed to be taken into consideration. Perhaps most impressive were the writings of the practitioners. We felt it necessary to have an alternative or contrast group, so we picked a number of historically important educational writers, for example, Plato and Rousseau. The progressive educators of the 1920s were studied. There were a great number of what might be called the romantic critics of education such as Herbert Kohl who wrote Thirty-six Children, and Holt. There was also another movement at that time, the affective educators such as Terry Borton and others. This brought our total to eight groups of writers.

The selected works of the 28 authors or co-authors chosen were examined for their attention to each of the eight themes. Each author was scored on a three-point scale, with a rating of three indicating heavy stress on a particular theme, a rating of two indicating moderate stress, and a rating of one indicating either negative stress or the absence of that theme. Plato's Republic, for example, is replete with philosophical assumptions which determine the program of education he describes. These assumptions, however, are for the most part antithetical to those espoused by open educators and his is therefore rated one on the theme of assumptions.

Table 1 on the next page gives the result of this rating process in summary form. It gives a specific rating to each group of writers for each of the eight themes and begins to illustrate the induction of theory that can be done from writings.

About 200 statements that characterized open education, made as clear and explicit as possible, were developed from these writings. We sent these to the practitioners, critics and others who had been writing about this subject. We asked them if these statements were truly authentic features of open education. Of course we got a lot of arguments. There was a great deal of nitpicking and changing of the items and so on. But from their responses we took, you might say, the purest items, the most acceptable to all of these different people. We felt that each ought to be subject to operationalization. This resulted in about 100 statements or so.

We next selected what we hoped would be relatively untrained observers who were neither psychologists nor educators, but were bright graduate students who had a bit of extra time. We sent them to England and to the United States to classes that were nominally open and classes that were nominally traditional and had them make ratings of the classes using these 100 statements. We also asked the teachers themselves to rate their own classrooms. We attempted to build in relatively neutral items so it didn't appear to be "good" to be an open educator.

As you can see in Table 2 on page 36, the F values for the group variable, open versus traditional, are significant. Group is a potent variable. All of the findings are highly significant.

In summary, this first paper represents and illustrates the idea that theories can be derived from practice. A practical theory, in terms of a definition of open education, was developed from an analysis of literature. This definition, operationalized in terms of a questionnaire, was validated in a systematic, efficient way. One didn't have to be an expert to use the questionnaire. So it becomes a useful instrument for further research and for educating others in the principles of open education.

Table 1. A summary of a content analysis by theme and group (open educators)

	Analysts/ Re-Searchers	Reporters/ Observers	Advisers/ Advocates	Practi-tioners	Open Education Overall Means*	Writers of Historical Importance	Pro-gressive Educators	Popular Critical	Affective Orienta-tion
Provisioning for learning	3.00	3.00	3.00	2.66	2.88	1.66	3.00	2.50	2.25
Diagnosis of learning events	3.00	2.50	2.66	2.50	2.63	1.33	3.00	2.50	2.25
Instruction-guidance and extension of learning	3.00	3.00	3.00	3.00	3.00	2.00	3.00	2.50	2.25
Reflective evaluation of diagnostic information	2.66	2.75	1.33	2.50	2.38	1.33	2.00	3.00	2.25
Humaneness-respect openness, and warmth	3.00	2.50	2.00	2.66	2.56	2.33	3.00	3.00	2.75
Seeking opportunities to promote growth	2.66	2.75	2.33	2.66	2.63	1.33	1.33	2.50	2.25
Self-perception of the teacher	2.66	2.25	2.33	2.50	2.44	2.33	2.33	2.50	2.75
Assumption-ideas about children and the process of learning	2.66	3.00	3.00	2.83	2.88	2.33	3.00	3.00	3.00

*These means represent the average of all 16 authors and co-authors from the first four groups.

Table 2. F-tests for the effect of group, traditional or open, on questionnaire responses.

Questionnaire multivariate:		8.7***
Provisioning	(.90)	48.7***
Humaneness	(.33)	25.1***
Diagnosis	(.34)	8.0***
Instruction	(.71)	20.9***
Evaluation	(.41)	22.3***
Seeking	(.44)	5.4**
Self-perception	(...)	14.0***
Assumptions	(.22)	3.1*

Note: Alpha internal-consistency reliabilities of criteria given in parentheses; since self-perception has only one item, internal consistencies could not be computed for this scale; 1, 2, and 3 asterisks indicate, respectively, the .05, .01, and .001 significance levels.

Now I would like to turn to the second paper, "Psychological Theories of Educational Individualization," from a book edited by Harriet Talmage and titled Systems of Individualized Education. In this paper I first started with an ordinary dictionary definition of a controversial subject, or at least a subject that is not well understood. "Individualization," for some, means being humane; for others it means tutoring. Ordinarily I like to use a dictionary definition because it is the most common use. But, as I illustrate in Table 3 on the next page, as we analyze the definitions from Webster's Third, we find a lot of fundamental psychological and educational questions unanswered.

Does the child possess native individuality or must he be made more individual? Are the same or different means of education appropriate for different children? Are the same or different ends suitable for different children? What determines the ends and the means? In short, dictionary definitions and approaches to educational constructs can be confusing, deceptive and over-simplified. Taxonomic approaches may be more useful.

Table 3. Dictionary definitions of individualization and related educational implications

Definition	Implication
1. a. To make individual in character; invest with individuality.	Implies instructional activity aimed at a predetermined (end) unique to each individual but not necessarily determined by him. Might deny both equality of result and equality of opportunity. Might deny initial individuality of student in implying that he must be made individual.
b. To treat or notice individually; particularize, specify	"To treat" is not specific with regard to ends or means or with regard to opportunity for or result of instruction. The remainder of the definition and definition (1c) both imply passive perceptions and are even less specific.
c. To distinguish.	
2. To put into the hands or management of an individual	Suggests allowing the student to develop by himself the means and ends of his education. Might deny teacher and parent preferences and allow collectivist or standardized means and ends in conflict with definition (1a).
3. To adjust or adapt (as a treatment of justice) to the needs or special circumstances of an individual	Implies alternative means but leaves open the possibility of fixed ends, possibly collectivist or standardized. Might deny student a role in the determination of ends and means.

Source: Webster's Third New International Dictionary (1970), where the definitions are listed in order of common, central meanings.

Let's consider a taxonomic approach to theory building whereby one analyzes traditions of philosophical and psychological thought. As an example, in this second paper I first showed a taxonomy in table form of continental European tradition of learning theory. This was done by listing a source, i.e. "Descartes," and then his theory, "Sharp Platonic dualism of ideas and observables; subjective introspection of innate ideas; because knowledge develops within the child, the teacher is superfluous (p. 9). Presented next was a similar taxonomic table on Anglo-American tradition of learning theory, i.e. "Darwin" and "Species improve over many generations through competition and selection; the survivors are ideally suited to the environment" (p. 10).

Such listings are useful in guiding practice and research. The behavioral sciences tend to be historical. We keep re-inventing things in the field of education. I think this taxonomic approach can eliminate such problems of research and educational practice.

I'd like to take this taxonomic process one step further. Sometimes when people are not on the same wavelength, particularly continental Europeans and Americans or Anglo-Americans, there are problems in communication. Traditions can often enrich one another when they are brought into more explicit confrontation. Various psychologists, and perhaps people in other disciplines as well, have tried to bring these two traditions into greater juxtaposition and to synthesize them. This is represented in Table 4 on the next two pages.

Another rich source, then, of theory building in nutrition education and other areas of the curriculum is to draw on the philosophical and psychological traditions. We don't have time to reinvent the wheel.

Theory Built from Taxonomic Analysis

Now I would like to talk about this notion of attempting to make categories from instructional practices. I read the voluminous writings on instructional practice and instructional theory and attempted to build a taxonomy. There are notable taxonomies, of course, in biology and other fields. A taxonomy might desirably have the characteristics of including every single species, so to speak, but also having categories that are mutually exclusive. This is what I was trying to do here. I was trying to lay out or develop models for every possible form of individualized instruction. Let me go through a few of them and tell you a little bit more of why I have been trying to do this.

The first on my list was "selection." Selection procedures are used to individualize instruction. A student takes the SAT or ACT; if the score on the achievement test is not high enough the student does not get into college. This is one of the most prominent forms of individualization in higher education.

Table 4. Movements toward synthesis of continental and Anglo-American traditions of learning theory

Source	Theory
*Herbart (1776-1841)	Mind as dynamic interplay of external and internalized ideas; instruction as assimilation of new "apperceptive mass."
*James (1842-1910)	Consciousness as personal and changing; each conscious state a function of the entire psycho-physical reality; mind as cumulative rather than recurrent.
Uexkull (1864-1944)	Ecology as study of interaction of organism with natural environment.
Lewin (1890-1944)	Psychology as study of person in relation to "lifespace" and surrounding perceptual environment.
Piaget (1968)	Child development as product of the dialectic of accommodation of child to object and assimilation of object to child leading to successive adaptions. Since learning proceeds in irreversible stages, two types of instructions are futile: that which centers on a stage later than one the child has not completely mastered and that which centers on a stage the child has already completely mastered.
*Murray (1938)	Importance of both the "objective" environment as observed by the psychologist and the subject's perception in understanding personality development.
Brunswik (1949)	Importance of distal and proximal stimuli and subject's subjective perception of them.

Table 4. (continued)

Source	Theory
Barker and Wright (1951)	Adaptation of subject to changing stimuli in the "behavior setting"; adaptation of setting in subject.
*Cronbach (1957) *Cronbach and Snow (1974)	Psychology must integrate separate traditions of individual differences and stimulus qualities; education can exploit "aptitude treatment interactions," tendencies for different treatments to benefit different students differentially.
*Bloom (1963)	Impact of environment greatest on individual development during the early and most rapid periods of growth; importance of home environment during the first six years of life for intellectual development.
*Walberg (1971) *Walberg and Marjoribanks (1974)	Person environment interaction: different home environments produce different growth patterns of multiple abilities in different children; student and teacher as collaborative judges of appropriateness of environment and of instructional means and goals

Note: For living theorists, reference dates are given rather than years of birth and death. Names with asterisks have been added to Riegal's list.

The next two, however, are prevalent forms of instructional models used in ordinary classroom practice in the United States, going back to the 1920s. One is enrichment and the other is acceleration. In enrichment there is a fixed amount of time, a series of lessons, and perhaps diagnostic examinations. The lessons are a, b and c, and everybody goes through the same sequence of lessons in the same amount of classroom time, presumably with the same amount of homework. There are differences in degrees of accomplishment and since some students are more efficient in learning, so there will be a normal distribution of achievement at the end of the course or unit.

Acceleration is a term that includes many instructional theories. In this system time is allowed to vary so the child is given as much time as needed to master the content. Formative tests are given after the units and the child is not allowed to go on to the next unit until he has mastered the previous unit. In this case, the time spent on learning is variable but the posttest criteria are the same. Enrichment and acceleration are the two dominant instructional theories of individualization.

The next two theories are diagnostic approaches and are termed hierarchical and random. These came from the large-scale research and curriculum development sponsored by the federal government. They were, specifically, Individually Guided Education developed at the University of Wisconsin, Individually Prescribed Instruction that came out of the University of Pittsburgh in the Learning and Research Development Center, and Project Plan that came from the American Institute of Research in Palo Alto, California.

These large-scale curricula are based on these two models. The first one is the hierarchical model: you can't learn B until you have mastered A. We give you a diagnostic test at the beginning to find out where you are. The view or assumption in such curricula is that learning is hierarchical.

On the other hand, a randomized diagnostic curriculum would suggest that some people can learn B before they learn A; it doesn't make any difference about the sequence of elements. It is highly individualized and is based on the view that each child may have a mastery of a particular combination of elements. Perhaps a teacher could not make this individualization, but certainly the computer could keep track of what area the child has mastered. So the computer has enabled these two forms of instruction to become much more prevalent in the last decade. These probably are going to be increasingly popular in the next several decades as microprocessors and main-frame computers become more available in classroom work.

What are the observable consequences of these theories? I mentioned earlier my admiration for Karl Popper's notion of falsification. The notion here is that whether these models and their characteristics are fixed or variable, or whether the coefficients of the characteristics are positive or negative, is susceptible to empirical inquiry. For example, does fixing the amount of time spent on learning result in a positive, neutral or negative effect on achievement? We empirically study this to provide an answer.

So, as I see it, the role of theory in educational research is to draw on other disciplines, especially philosophy, psychology, sociology, and so on, to make issues explicit and clear, to devise taxonomies and categories, to identify positive or negative relationships, and then to collect data to see how these things turn out by empirical tests in practice. So the five models I discussed could be viewed as a series of hypotheses that could be tested in instructional research.

I'd like to present one more theory that has been "soundly" falsified through research to show how the process can work, because it is a clear-cut case. This model or theory or hypothesis has probably been the most prevalent in instructional research and educational psychology in the last two decades, based on a paper written in 1958 by Lee Cronbach of Stanford University. Cronbach held that there were two disciplines in psychological research, one focused on individual differences that were studied by correlational methods, the other being the experimental tradition that manipulated treatments in the spirit of R. A. Fischer's treatment randomization.

Cronbach proposed in this 1958 paper that these separate fields in psychology be brought together so that we could simultaneously study individual differences and educational treatments. The paper has probably been cited a thousand or fifteen hundred times. It became a very dominant paradigm or model in educational psychology and educational research in general. He felt that some educational treatments were better for some children and other treatments were better for other children. By using more complicated regression models, we ought to be able to say, "Here's Johnny, he is type A, give him curriculum type 23." The reason that so much research was done on this, in my belief, is that it was so explicit, so testable, and so falsifiable. And it was falsified. Probably 500 papers have been written on this subject. While occasionally you turn up cases where children who may be more spacially oriented might learn a little faster from graphs, it has been incredibly difficult to replicate such findings.

And this makes another point, the importance of replication. It seems to me that we in educational research evaluation and nutrition education research are not as advanced as the physical sciences in supporting replication research. We really need several studies to establish generalizations. And maybe we need a dozen if we are looking for subtle and elusive effects.

The point related to theory building is that these models, particularly iconic representations or graphic models, represent hypotheses. They are testable and they can give some feeling of categories and taxonomies to a field of research.

Theory Induced from Mathematical Models

I would like to turn to the last paper. I promised you, in addition to the verbal and iconic representations, a little bit of mathematics. Economists have a lot of useful theories that have been developed and tested. They are perhaps the most explicit of all the behavioral sciences. If you put something down in a formula, it becomes explicit. And being explicit is one of the keys to developing good theory.

Let's consider the famous Cobb-Douglas formulation that national output is a function of capital and labor:

$$O = aK^{b}L^{c},$$

where a is a constant and b and c are the coefficients for capital and

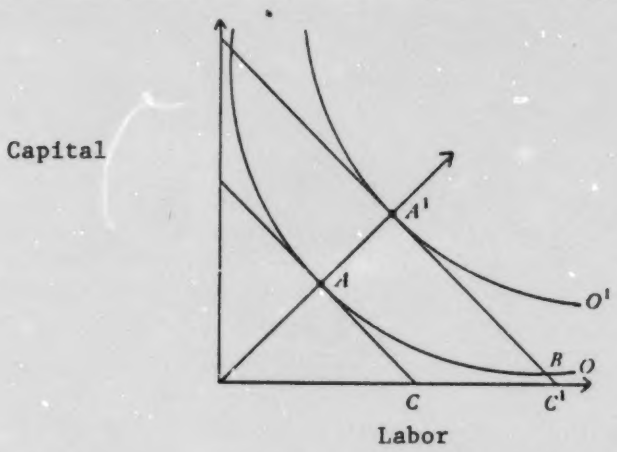
labor. There are a number of attractive features of this model that make extraordinarily good sense in thinking about educational research in nutrition and other fields.

I take learning to be the fundamental problem of education. The principal goal of education is to increase the effectiveness of learning. There are a number of interesting properties related to this goal that can be derived from the Cobb-Douglas model. The first is diminishing returns. As we increase a factor, such as more time for instruction, eventually we get diminishing returns. There is the famous James Langlong psychological principle that says if you increase it too much you will even get negative returns. Increasing motivation too much, for example, may result in debilitating anxiety.

A second interesting example of adapting this economic theory to education is that if you have a zero amount of any ingredient in the formula you get no output. So if you spend no time on learning you won't learn anything. If you have zero motivation you won't learn anything. I think that these are rather interesting and explicit hypotheses.

In Figure 1 below is another formula illustrating the notion that in economics, labor and capital can trade off for one another to a point.

Figure 1. Equal-product and equal-cost lines

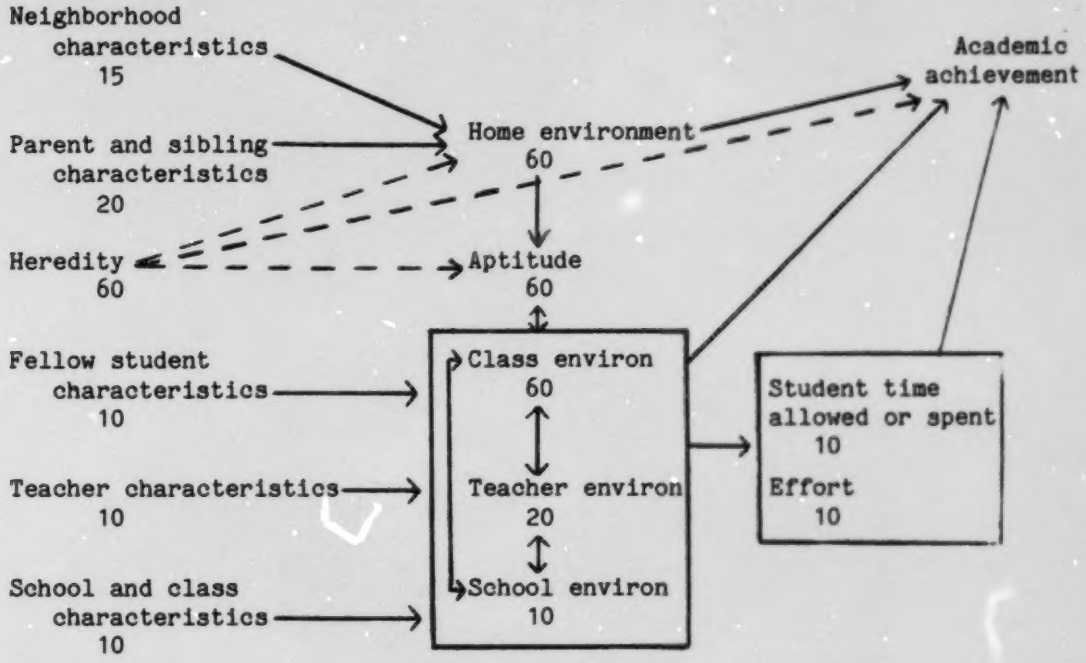


Note: Line O represents the various combinations of labor and capital required to produce a given, equal amount of output. Line C represents the combinations of labor and capital of given costs. A is the point of lowest cost for a given output O_1, since any other point, for example, B, requires higher costs. A^1 indicates the minimum cost for a higher quantity of output O^2 brought about by increasing capital and labor by the same amount, assuming their costs are equal for purposes of illustration rather than either one excessively.

If we have a farm, for example, and we keep adding labor to the farm, at first output goes up. But after we get to 50 farmers on one farm, labor no longer substitutes for capital in a constructive way. After you had 100 farmers you might even get negative returns as they get in each other's way.

Now, how could we derive from this economic formula a similar formula for education? Another iconic representation in Figure 2 shows some of the chief sociological and psychological characteristics of school learning.

Figure 2. Production factors in school learning



Note: The figures for each factor are representative estimates of the percentage of accounted-for variance in learning.

On the left-hand side are what I call distal variables. They are undesirable variables from one point of view because they are removed from instruction and tend to be unalterable. We cannot manipulate neighborhood characteristics, parent and sibling characteristics, heredity, fellow-student characteristics, etc., very well. Nevertheless, it has to be acknowledged that they are associated with learning and may even influence or cause learning.

The next set of variables is closer to the phenomenon of learning. For example, in contrast to socioeconomic status, which accounts for about 2% of the variance according to recent research syntheses, home environment accounts in some studies for as much as 50 to 60% of the variance in the child's learning. Aptitude or I.Q., teaching environment, school environment, time, effort and age are also essential ingredients. This is a sensible set of theoretical constructs that are related to learning output.

If we apply the Cobb-Douglas economic formulation to these variables that psychology has identified as being useful and strong and consistent correlations of learning outcomes, we have a regression equation:

$$Ach = a(Abl)^{b}(Mot)^{c}(Qul)^{d}(Qun)^{f}(Cls)^{g}(Hom)^{h}(Age)^{i}$$

This can be transformed into a standard log linear model which can be easily estimated in an ordinary least squares regression:

$$\log(Ach) = \log a + b \log(Abl) + c \log(Mot)...$$

As an example, our group applied the model to the National Assessment data. It allows us a set of hypotheses that seem sensible and plausible from an educator's point of view, and are falsifiable -- explicit and testable. Some examples are:

1. Increasing any production factor like motivation, time and ability, will increase the amount of achievement. Ability and motivation, perhaps, are less susceptible to manipulation, while the school may have control over the quantity and quality of teaching.

2. Increasing any factor while holding the others fixed produces diminished marginal returns. That is to say, to take time, a factor that has been most intensely investigated, if you keep increasing time, the child will keep learning but the amount gets smaller and smaller.

3. A direct extension of the economic production function is that any factor equal to zero results in zero achievement. Unlike capital and labor, however, the educational production factors may not have validly measurable zero points. Thus, it is more reasonable to hypothesize that when any factor is near minimum, it is unlikely that achievement will be high unless the other factors are near their maximum levels. Educational and psychological measurement tends to be very primitive compared to what can be done in physics and biology, so we don't have what economists call "cardinal scales" or what psychologists call "ratio scales." It is possible for us to think of somebody that has zero motivation, but it is very difficult to measure it. Nevertheless, it is conceptually or theoretically attractive to think about these things. The problem is that the methodology, not the theory, is at fault; and we have a long way to go in operationalizing some of these constructs.

I want to remind you again that my criterion for theory is that it is falsifiable. In fact, this theory was falsified to some extent. It turned out that the most potent factor in this test was classroom morale; that is to say, how well people got along together or the social-psychological environment of the group.

In the paper we are discussing there are ten points that can be derived from this educational adaptation of the Cobb-Douglas theory to criticize prior studies and to point out methodological flaws in them. Using the theory we can ask: "How can we criticize prior research? How can we account in some instances for why people found some relationships and didn't find other relationships, particularly in large-scale evaluations, that would perhaps be relevant to the field of nutrition education?" This process is important to theory-building activities.

Now I'd like to show how theories can be analyzed and tested against each other to build theory for a discipline. I'll go into the theories of John Carroll and Ben Bloom that have been very influential in educational psychology and instructional practice. I'll show why these may be considered special cases of the productivity theory that considers time and quality of instruction, motivation in the home environment, morale of the class and so on.

The instructional theories of Carroll (4) and Bloom (5) may be interpreted as acceleration models within the production-theory framework. Carroll's formulation is:

$$\text{degree of learning} = f\left(\frac{\text{time actually spent}}{\text{time needed}}\right)$$

where:

> the numerator of the fraction will be equal to the smallest of the following three qualities: (a) opportunity--the time allowed for learning; (b) perseverance--the amount of time the learner is willing to engage actively in learning; and (c)--the amount of time needed to learn, increased by whatever amount is necessary in view of the poor quality of instruction and lack of ability to understand less than optimal instruction. This last quantity (time needed to learn after adjustment for quality of instruction and ability to understand instruction) is also the denominator of the fraction (Carroll, 1963, p. 730).

Recast in the production function: (a) opportunity becomes quantity of instruction, that is, time allowed including self-instructional time; (b) perseverance becomes motivation (although an observer rating the percentage of engaged time is a reasonable proxy or even a more direct though expensive measure); (c) time needed becomes unadjusted ability; and (d) quality of instruction explicitly enters the equation rather than adjusting ability. Thus, rather than redefining all the independent variables in terms of time, the production function would assess the direct effect of each measured factor (including student age, the

home environment and the social environment of the class because of their known connections with achievement) in an explicit equation form. Bloom's adaption of the Carroll model may be written:

$$\begin{pmatrix} \text{level of achievement,} \\ \text{affective outcomes,} \\ \text{rate of learning} \end{pmatrix} = f\begin{pmatrix} \text{quality of instruction} \\ \text{cognitive entry behaviors,} \\ \text{affective entry behaviors} \end{pmatrix}$$

In the production function, affective outcomes would be considered a particular type of achievement possibly involved in a feedback loop with motivation for subsequent achievement. Instead of measuring time to reach a criterion or gain in achievement divided by time to obtain a rate, time would enter the equation directly as an independent variable, quantity of instruction. The other variables have obvious correspondences in the production function. Thus, the sets of redefined variables in the Carroll and Bloom theories may be hypothesized to show substitutability and diminishing returns of the function.

Let's take, as an actual illustration of the theory, the discouraging evaluation of Sesame Street, the children's television program. The purpose of Sesame Street was to reduce the gap between poor and middle-class children. The Sesame Street evaluations done by Samuel Ball of Educational Testing Service found that Sesame Street was beneficial to children's learning. Both poor and middle-class, or the disadvantaged and the advantaged as they were termed, were higher in achievement, pre to post, than the groups that did not watch Sesame Street. However, advantaged children actually benefited more from Sesame Street than did disadvantaged children, thereby increasing the gap between the two groups and defeating the original purpose of Sesame Street.

This phenomenon could have been predicted using the productivity theory and, after the fact, can be explained by it. Home environment accounts for a large portion of the variance in the child's learning according to the theory. Also, even when holding all other variables constant, increasing the time variable has the potential of increasing achievement for everyone. With the refinements of Bloom's theory, that level of achievement is affected by cognitive and affective entry behaviors, we might be able, from the Sesame Street research, to develop the following hypothesis for future falsifiability tests: Up to some as yet unknown point, the higher the cognitive and affective entry behaviors, the greater will be the student learning from a new educational intervention.

So it goes with theory building--adding and subtracting bits and pieces of the theory based upon research. Your role as nutrition education researchers is, as I see it, to use this theory-building process to the advantage of the field of nutrition education.

A Concluding Caution

That causes me to go into my concluding point, a caveat which I give to all theory builders and particularly myself. In addition to all the things I have said about developing and using theories, there are also inherent values to consider.

Many of these theories do hold values in them. For example, in addition to trying to improve educational achievement on cognitive tests, there are many other things in life. The famous sociologist Max Weber has pointed out that values are especially great determinants of social and behavioral theories. One of the reasons, perhaps, that physics is the queen of the university is that physics is relatively value-free. It is objective. There is no such thing as a national physics. There is a universal science of physics that is applicable in every country. But, in education, our values, traditions and opinions can very much shape the kinds of educational research we do and the kinds of theories we evolve.

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TOWARD A FRAMEWORK FOR THEORY BUILDING IN NUTRITION EDUCATION RESEARCH

Isobel Contento

"There is nothing so practical as a good theory."--Kurt Lewin

There have been a number of recent nutrition education research conferences in which experts in the behavioral sciences have described how research in their disciplines can be used in nutrition education research and practice (e.g., 1, 2). This conference is designed to go beyond the previous ones by attempting to look for strategies to integrate the various approaches derived from these disciplines into some kind of framework for theory building in nutrition education research.

A number of approaches to nutrition education have also been presented at previous conferences as well as at this one. An examination of these makes it clear that these different educational approaches, being derived from different frameworks in psychology, carry with them different assumptions about the determinants of nutritional behavior, different research methodologies and different implications for how nutrition education should be conducted. As we nutrition educators begin to borrow widely from the behavioral sciences those theories we think useful, we need to consider carefully the assumptions and implications that come with the theories we borrow to ensure that they are congruent with the purposes we have in mind.

In this discussion, therefore, I will examine the assumptions and implications of some of the major psychological and educational theories used in nutrition education research and practice. I hope that such an examination will facilitate: 1) the selection of a theory or a combination of theories appropriate to the goal desired and the task at hand, 2) the comparison of research results derived from different traditions and 3) the identification of areas where further research would be profitable so that theory building can be advanced.

Implications Of Various Psychological Traditions For Nutrition Education Research

For the purposes of this examination, the psychological theories will be placed into three categories: 1) the cognitive-gestaltist framework (including the sub-categories of "humanistic" and developmental psychology), 2) the behaviorist or associationist framework, and 3) the social-psychological theories. Although the third category is defined primarily in terms of its subject matter rather than its orientation, it is described here as a separate category for reasons to be given later. The salient features of these three categories, their derived educational ideologies, their assumptions and methodologies and their implications for nutrition education are summarized in Table 1. They are arranged to represent an approximate continuum from cognitive to behavioral when going from left to right. The cognitive and

Table 1. Psychological theories, educational ideologies and nutrition education research and practice

Psychological Theories	Cognitive-Gestaltist Framework "Autonomous individual" more important More concerned with inner experience	Social-Psychological Theories Concerned with mental preparation to act / Social Interactions		Behaviorist-Associationist Framework External environment more important More concerned with overt behavior
Methodology	Clinical investigation & reasoned interpretation	True and quasi-experiments, surveys		True experiments
Sub-groups	Maturationiste: Rousseau, Maslow "unfolding" Interactionista: Piaget, Kohlberg person environment interactions "constructivism"	Social Cognition & Motivation Lewin's "field theory" & group dynamics Consistency theories e.g. attitude & attitude change theories, cognitive dissonance Value-expectancy theories e.g. decision-making models, SEU, HMB, BIM. Attributional theories	Persuasive Communication Hovland Sender message channel receiver effect	Social Learning Theory Bandura Behavior ↔ Person ↔ Environment self-management skills stimuli reinforcement Behaviorists Watson, Skinner stimulus, response, reinforcement behavior modification
Derived Educational Ideologies	More concerned with Self-actualization / Development "Romanticism": A.S. Neill, Carl Rogers. Student-centered learning Progressivism: Dewey. Enhancement of development thru experiential problem-solving situations	(see text)		More concerned with guided teaching & learning Information/skills transmission: Thorndike, Skinner Achievement of externally prescribed skills & knolwedge Competency-based education
Underlying Assumptions	People basically good, rational. Given freedom, will adopt healthy behaviors.	People make nutrition decisions in light of their developmental level.	(see text)	People's behavior determined by reciprocal interaction of environmental, cognitive & behavioral factors.	People's behavior determined by envrioenment. Not truly free to adapt healthy behaviors when so many factors reinforce unhealthy behaviors.
Goal of Nutrition Education	To provide information in accepting manner	To enhance ability to make complex food/nutrition decisions.	To change behavior by: changing attitudes; influencing beliefs, values, expectancies, attributions; creating cognitive dissonance; providing enabling factors in environment. Or, to improve the quality of decision-making.	To shape or change behavior by improving cognitive & behavioral skills.	To shape or change behavior through appropriate stimulus and reinforcement arrangements.

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behaviorist frameworks will be described first and the social-psychological theories, which draw from both frameworks, will be described later.

An examination as brief as this one is not intended to serve as a comprehensive review of all psychological and educational theories. Neither is it possible to evaluate all the theories presented. Further, it is recognized that categorization for the purposes of capturing the essence of varies theories and frameworks may lead to over-simplification. I believe, however, that the categorization presented here is useful for illuminating the pertinent differences between the various psychological and educational theories from which nutrition education has drawn. These key differences result in differing goals and strategies for nutrition education and differing methodologies for conducting nutrition education research. It is these differences that nutrition educators need to keep in mind as they conduct their research activities.

The Cognitive-Gestaltist Tradition

Included in this category are a number of loosely related theories which, although they attempt to account for all of human behavior, emphasize the uniqueness of the individual and of inner, cognitive experience such as thinking or insight for learning and behavior. Their origins go back to Descartes, who believed that knowledge develops from within, and to Hegel, who maintained that cultures and individuals progress through stages of development. In contrast to the associationists, who believed that mind was composed of individual elements or items of experience linked by associations, the gestaltists believed that "the whole is more than the sum of its parts". One must study the totality or gestalt, not just the elements of mind or behavior. Mental growth involves, therefore, qualitative changes or shifts in structural "wholes" and not merely the addition of isolated "bits" or elements.

The maturationists. Within the cognitive-gestaltist tradition there are two discernible camps. The maturationists view cognitive and emotional growth as the unfolding of pre-patterned stages. Today this tradition is represented by "humanistic" psychology, which emphasizes the growth of the "whole person" in whatever direction the person values or chooses. The environment's role is limited to one of providing the necessary "nourishment". Self-understanding and creativity as means for self-fulfillment or self-actualization are central concepts.

The educational ideology which derives from the maturationist tradition goes back to Rousseau's notion of the child as "noble savage" whose inherent goodness should not be corrupted by adult society and for whom instruction should be based on direct experience, preferably with the world of nature. His ideas were part of a larger philosophical movement, the "romantic," which emphasized the natural inner self. Hence, this ideology is labeled "romantic" in Table 1. These notions have led to modern educational applications which are child-centered in varying forms and to varying degrees. The environment should be permissive enough to allow the inner good to unfold and to control the inner bad. For example, A. S. Neill's Summerhill (3) is a school based on

these ideas and Carl Rogers (4) has advocated not only psychotherapy that is "client-centered" but also education that is "student-centered." The aim of education in this ideology, as of psychotherapy in humanistic psychology, is self-actualization.

The underlying assumption of this approach which is relevant for nutrition education is that people are basically good and rational. Given acceptance and freedom of choice, they will adopt those behaviors that are healthy and self-actualizing. The goal of nutrition education is therefore to provide relevant information and activities in an accepting, non-judgmental manner.

This approach is used quite widely by nutrition educators, (e.g., 5) many of whom probably do not realize that this represents a definable tradition in psychology and education, carrying with it the above assumptions about human nature. Many activity-based and "discovery learning" programs derive from this tradition.

The interactionists. The interactionists are often confused with the maturationists but differ from the latter by their greater emphasis on the importance of person-environment interactions for mental and moral growth. The interactionists have also developed explicit theories about how such growth or development occurs.

Piaget (6), who provides a contemporary example of this tradition (also known as "stucturalist-organismic"), postulates from his extensive work with children that development represents transformations or changes in children's underlying "cognitive structures" or internal mental patterns as they interact with the environment. The interaction is seen as an active process consisting of two complementary processes. Children assimilate new information or experiences which fit into existing forms of knowledge, patterns of thinking or cognitive structures. However, ideas or experiences which contradict previously held understandings force persons to accommodate the new ideas or experiences by reorganizing their existing mental patterns or by "constructing" new ones. As a result the cognitive structures undergo a change and can assimilate more ideas and knowledge. Mental growth therefore consists of a series of assimilations and accommodations resulting in increasingly more complex and integrated cognitive structures and hence in more complex understandings or abilities to reason. Children move from pre-logical (or "pre-operational") thinking to the ability to use causal reasoning (or "operational" thinking) around ages six to eight. At first, children can only carry out logical reasoning when dealing with concrete problems, called concrete operational thoughts. However, many later come to use formal operational thought or abstract reasoning which enables them to consider all the possibilities, including the hypothetical ones, in problem-solving and to be aware of the consequences of these possibilities.

A similar process is proposed by Kohlberg for moral development (7). From his studies he proposes that the human subject gradually constructs a sequence of ever-more-complex moral-judgement patterns through his interactions with his social environment. Kohlberg proposes six patterns or stages. In Stages I and II ("pre-conventional

morality") morality choice is largely based on survival needs or on satisfying one's own personal needs. During Stages III and IV ("conventional morality") a person's moral judgments are based on doing what is nice and pleases others (III) or on complying with laws, codes or rules (IV). An individual at the "post-conventional stages" behaves in accordance with social contract (V) or with some universal principle, such as justice (VI).

Gilligan (8) extended the work of Kohlberg and found that women's stages differ somewhat from those described by Kohlberg, which are derived largely from samples of men. For women, moral choice also begins with a stage of concern with satisfying one's need ("selfishness") and moves to a stage where choice is based on satisfying the needs of others ("self-sacrifice"). Finally, however, moral judgments become based on responsibility in relationships. That is, for men moral development emphasizes autonomy and separation and hence notions of justice, principles and rights, while for women moral development emphasizes the connectedness of life and hence notions of responsibility and interdependence.

The educational ideology related to this developmental tradition has Dewey as its leading theorist and is still best called "progressivism" after Dewey (9). Unlike romanticism, however, where the educator provides an accepting atmosphere so that unconflicted and unhindered growth can occur, here the educator provides experiential problem-solving situations involving cognitive and moral conflict. This is so that, out of the person's struggle to assimilate and accommodate his or her experience with the environment, the person will develop the capacity (cognitive structures) to make increasingly more complex decisions and moral choices.

The research methodology in this tradition is that of clinical investigation accompanied by reasoned interpretation. The clinical method involves in-depth probing of the subject's thinking so as to permit maximum opportunity for the display of cognitive competence and moral choice processes. The clinical method has also been adapted for use with large groups using procedures which preserve the phenomenonological approach.

The underlying assumption in this tradition relevant for nutrition education is that people understand and use information, reason and make moral choices in accordance with the current level of their cognitive and moral development. The goal of nutrition education is either to provide information and activities that are cognitively and morally appropriate to those levels or to stimulate people's reasoning skills and moral development so that they will be able to make more complex cognitive and moral decisions about issues of food and nutrition.

A Piagetian framework has been used in a few studies involving food (e.g., 10 and later in this conference). Health educators have also proposed that cognitive and moral development are very important variables in people's ability to make decisions about health matters (11).

The "romantic" and "progressive" approaches are often thought to be one and the same. However, the former approach emphasizes the rather value-relative notion of self-actualization as the aim of education while the latter emphasizes cognitive and moral development. Both have a common emphasis on allowing the individual the decision to adopt nutritionally healthy behaviors. However, the developmental approach argues that the nutrition educator must also take into account the reasoning and moral-choice skills of the target audience and/or should enhance those skills.

The Behaviorist-Associationist Tradition

The association theorists represent a tradition that traces its history as far back as Aristotle's notion of the mind as the association of mental elements. In this view, also called elementalism, learning and behavior are seen as the result of associations or connections between stimuli (sense impressions) and responses. This view is in contrast to that of the gestaltists or structuralists, who insist that the mind or behavior should be seen as a structured whole. The scientific method as used by physical scientists has always been required by associationists and was used by Pavlov and Thorndike in the early part of this century to amass a great deal of information about learning and behavior.

The behaviorist. John B. Watson believed the only thing observable, and therefore subject to scientific study, was a person's overt behavior. Thus was behaviorism born. Skinner, a direct theoretical descendant of Thorndike and Watson, further stripped behaviorism of any mentalistic overtones. Skinner argued (12) that an experimental analysis of behavior gives us no reason to posit an autonomous inner being. Feelings, attitudes, intentions and ideas simply accompany or follow behavior; they do not cause behavior. Instead, behavior is determined by its consequences or by reinforcement which he defined in strictly operational terms as "any stimulus which, when added to the situation, increases the likelihood of the response occurring."

Skinner added another concept to behaviorism--operant conditioning. He divided all responses into two categories: 1) those that can be elicited by specific stimuli and 2) those, called operants, that occur spontaneously or where the original stimulus is either unidentified or unknown. Both kinds of responses can be conditioned by reinforcement. In the latter, however, the person first operates on the environment or emits a variety of behaviors (operants). Those behaviors or operants that are reinforced or rewarded by the environment are more likely to be performed again. Since reinforcement is a prime determiner of further action and since reinforcement occurs in the outer environment, it is the environment that shapes and changes behavior, as indicated in Table 1. Indeed, Watson quite clearly states, "Men are built, not made."

Behaviorism has been the dominant psychological tradition for much of the twentieth century and has had a profound effect on all arenas of

American life. It is not surprising, therefore, that the educational ideology derived from behaviorism has been very important in American education as well. Thorndike, whose name was synonymous with educational psychology for decades, channelled educational research into a scientific and empirical direction by placing great emphasis on studying only that which could be observed and measured. His theories of learning were derived from experimental studies on the behavior of cats, using specially designed "puzzle boxes." He is said to have thought that visiting a classroom was a waste of time. It is interesting to note that Dewey and Thorndike, with diametrically opposed views on education, were faculty members at Columbia Teachers College for several of the same decades.

Skinner has also been very interested in education. The goal of education, he believes, is to maximize "knowledge." Knowledge is, as opposed to being represented by, the sum total of all behavioral responses displayed by a person--the questions answered, diagrams drawn, problems solved, etc. So it is these specific behaviors which should be taught (the well-known "behavioral objectives") and their performance which should indicate knowledge gained. Knowledge, that is the repertoire of responses, is built through operant conditioning or reinforcement using items such as candy (primary reinforcers), grades, prizes or tokens (conditional reinforcement). Since reinforcement should be immediate to be most effective, Skinner strongly favors the use of teaching machines, programmed instruction and other systems of building immediate reinforcement into the learning process.

In general, education based on the behaviorist tradition emphasizes shaping or changing behavior to conform to an externally prescribed behavioral outcome (e.g., competency-based education, behavioral objectives or mastery learning). Even such methods as programmed instruction, which stresses the individual learning at his or her own pace, are designed to transmit sets of fixed knowledge or skills and to produce fixed behavioral outcomes. These models are therefore behaviorist in their orientation. Indeed, Skinner rejects autonomy-oriented or self-actualizing practices in education because he sees their claimed advantages as an illusion. "To refuse to control," he states, "is to leave control not to the person himself but to other parts of the social and non-social environment (p. 84)." (13).

The research methodology used in this tradition in both psychology and education consists, not surprisingly, of closely manipulated or controlled experiments in which only observable stimuli, responses and reinforcements are studied. This experimental methodology (experimental studies with clearly delineated dependent and independent variables, control groups, etc.) has become standard operating procedure for research even when researchers do not subscribe to the tenets of behaviorism.

The underlying assumption relevant for nutrition education is that, since people's actions are largely determined by the environment, people are not truly free to adopt healthy behaviors when there are so many environmental forces in society reinforcing unhealthy behaviors. The goal of nutrition education is therefore to change or shape behavior by using the principles of behaviorism.

The concepts of behaviorism have been used extensively by nutrition educators, usually in behavior-modification programs involving the obese. The strengths and weaknesses of this approach have been reviewed by Coates (14). The series of studies to be described by Birch at this conference represents one example of the use of an experimental methodology and a behaviorist perspective to study eating behavior in normal-weight individuals. Many recent nutrition curricula are based on behavioral objectives and emphasize behavior change as a criterion of success.

Social learning. This theory is often labelled as neo-behaviorist. It is also sometimes referred to as a social-psychological theory. It combines an emphasis on such behaviorist notions as reinforcement or contingency arrangements with the recognition of the importance of determinants of behavior arising from cognitive functioning (15). There are three key notions of social learning theory. First, people's behavior is not only influenced by direct experience or reinforcement of their own behavior but also by the observation of the consequences of reinforcements of other people's behavior. This is called observational learning, vicarious learning or modelling. Second, people's cognitive capacity enables them to represent external influences (e.g., reinforcement contingencies) symbolically and later to use such representations (e.g., anticipated consequences) to guide their actions. Thus people are capable of both insightful and foresightful behavior. Third, people are capable of creating self-regulative influences by, for example, managing the stimulus determinants of given activities and producting consequences for their own actions. Social learning theory therefore postulates that human behavior is determined by the continuous reciprocal interaction between behavior and its personal (cognitive) and environmental determinants. Therefore, not only does the environment shape a person's behavior, but also a person may partly shape his external environment.

In this model behavior change is seen as best brought about by using all the sources of influences on behavior simultaneously--environmental, personal and behavioral. Thus, environmental variables such as stimulus and contingency arrangements can be applied to produce and maintain change. Training can be provided in personal, cognitive or self-management skills (e.g., problem-solving and goal-setting skills and emotion-coping strategies). Through these strategies the individual can learn to control his or her own behavior by monitoring that behavior and by controlling the reinforcers. Behavioral variables can be influenced by providing the individual with opportunities to practice various target behaviors and experience the reinforcing value of these behaviors.

The goal of nutrition education in the social learning approach is to change people's behavior by influencing the personal (cognitive), environmental and behavioral determinants of behavior. One example of a nutrition-change program based on this approach is the Heart Healthy Program described by Coates (14).

Social-Psychological Theories

The cognitive-gestaltist and the behaviorist-associationist traditions discussed so far are the two main frameworks in psychology. Social psychology, a relatively new field, has emerged where the older disciplines of sociology and psychology overlap. It is concerned with the study of attitudes and social change and of interpersonal relations and group processes. As indicated in Table 1, there are a number of theories within this area. In common is an orientation that seeks to explain how an individual organizes or interprets his world subjectively in preparing to act. They therefore emphasize the cognitive perspective. Some theories, however, also include such behaviorist notions as reinforcement.

These social-psychological theories are placed in a separate category even though they may draw from both the cognitive-gestaltist and behaviorist frameworks. This is because the nature of the subject matter--the way in which individuals are affected by social situations--is highly relevant to nutrition education. Also, these theories provide explicit and systematic conceptualizations of the influence of perceived social context and internally derived motivations on behavior. Moreover, nutrition educators have begun to borrow heavily from these theories. Therefore, it seemed fruitful to examine their assumptions and implications for nutrition education and to place them in a context where they can be compared with the other traditions.

Social cognition and motivation. An important person in this area was Kurt Lewin who had an enormous influence on the emerging field of social psychology. He was interested in understanding and studying the determining forces underlying people's behavior. He was trained in the gestalt tradition but later developed his own unique approach. His "field theory" (16) and his study of group dynamics have proven highly productive as conceptual frameworks for organizing research and thinking on social-psychological issues.

Lewin postulated that an individual exists within a psychological field or "lifespace." This is the world as subjectively experienced or perceived by the person at a given point in time. Within this field are represented both the person's present state and also a variety of regions which tend to attract the person (positive valence) or repel the person (negative valence). Behavior (B) is the product of the totality of the forces acting in a person's psychological (cognitive) field. Forces arise both from the person (P) and from his perception of his environment (E). That is, $B = f(P,E)$. Goals, for example, are regions of strong positive valence. Further, goals toward which a person strives may have different degrees of difficulty or levels of aspiration. The choice of a particular goal level is determined by both the attractiveness or value to the person of achieving the goal at that level and by an estimate of the likelihood of being able to achieve that level.

A large number of social-psychological theories have come out of the work of Lewin, his students and colleagues. Only a few of direct interest to nutrition educators will be described here.

Cognitive consistency (cognitive dissonance). There are a number of consistency theories, including Festinger's cognitive dissonance theory (17). Festinger was a student and then colleague of Lewin. These theories have in common the notion that human beings become troubled when they recognize that their knowledge, beliefs, attitudes and behaviors are incongruous or inconsistent with each other. The discomfort caused by such recognition sets in motion cognitive processes that attempt to restore consistency. Festinger's cognitive dissonance theory, in particular, postulates that cognitive elements--bits of knowledge, attitudes, opinions or beliefs--can be in one of three relationships to each other: dissonant, consonant or irrelevant. Dissonance is aroused by the discrepancy between two or more relevant cognitive elements when one of these has to do with a person's own behavior (e.g., the cognition: "My diet is high in fat") and the other relates to the person's attitudes and perceptions (e.g., the cognition: "Dietary fat is a risk factor in heart disease") or to his or her external environment (e.g., the cognition: "My nutritionist has asked me to eat less fat"). The greater the magnitude of dissonance, the greater will be the drive to reduce dissonance, either by changing one's behavior, by changing one's attitudes and perceptions (which may also be called rationalizing) or by changing the environment.

The underlying assumption of relevance to nutrition education is that people's behavior is determined by the effort to bring about consistency among their knowledge, attitudes and behavior. The goal of nutrition education in relation to these theories is to provide nutrition information or other sources of nutritional influence that will produce dissonance about issues which, when resolved, will leave the person with a more healthful diet.

Many nutrition education researchers have in recent years drawn on this set of theories for their research. Sims has reviewed some of these studies (18).

The many studies on consistency theories indicate that the relationship among knowledge, attitudes and behavior is quite complex. Many non-attitudinal constraints, such as the ability to perform the behavior, competing attitudes about the same issue and situational variables, may affect the translation of attitudes into behavior. Further, general measures of attitude, as are often used, may correlate well with overall patterns of behavior but not with a single act (19). Attitudes have also been postulated to be the result of behavior, not its antecedent. These and other issues to do with the conceptualization of attitudes and attitude change are discussed by McGuire (20) and Fishbein and Ajzen (29).

Information processing. A brief mention will be made here of this theory, since Olson has attempted to integrate this theory with attitude theory (21). According to Olson, information-processing theory involves a set of broad, general, abstract ideas which, for the most part, are not testable but which have great heuristic value. These ideas are that: 1) mental processes operate on symbolic or cognitive representations of stimuli, 2) cognitive processes are linked together as a processing system, 3) these cognitive representations are stored in

memory in an interrelated, organized way which may be referred to as cognitive structures, and 4) that these stored representations may be retrieved or activated by exposure to appropriate cues or stimuli. Attitudes may be thought of as based on cognitive structures stored in memory. For example, attitude/knowledge structures may influence the information-processing operations involved in interpreting data or in making decisions. On the other hand, information-processes may be involved in creating and changing attitude structures. Thus, the information processing approach may provide another formulation of attitudes. The information-processing approach has been reported for a few studies in the field of foods and nutrition (e.g., 22,23).

Expectancy value/Decision making. Out of Lewin's field theory and notions of "value" and "expectancy" discussed earlier have grown a number of parallel "expectancy x value" models of human motivation (24). McGuire sees the "expectancy x value" approach as one way to formulate components of attitudes (20). That is, a person's attitude toward some object is composed of the person's evaluation (the "value") of a given goal multiplied by the person's perception of how conducive that object is to that goal (i.e., "expectancy"). This approach has more often been used as the basis of a number of models of choice or decision making (24,25). These decision-making models assume that choices are made among alternatives based on some consideration of the consequences in terms of their relative worth (or "value") to the decision maker as well as their likelihood (i.e., "expectancy") of occurring.

One such model is the Subjectively Expected Utility (SEU) model (24,25). This deals with the case where both the probabilities or expectancies of decision outcomes and the value or utility of each consequence to the decision-maker cannot be objectively determined. Instead, they must be subjectively estimated by each individual. The model assumes that choices are made to maximize SEU. Thus, the model predicts that the choice taken from among a number of alternatives is one where the sum of subjective probability and value or utility to the individual is largest. The particular variables are not specified.

The Health Belief Model (HBM) is a choice model where the subjective analysis is restricted to a few variables which are relevant to health. One formulation of this model (24) proposes that the likelihood of an individual taking a particular preventive health action is a function of three factors: 1) the "perceived threat" associated with an illness or condition (i.e., the incentive value to the individual of the health action), 2) a "benefits-minus-barriers" analysis of the advantages and disadvantages of taking that particular action (i.e., expectancy of success), and 3) various cues to action, either internal (e.g., perceived state of the body) or external (e.g., illness of family member or friend, participation in health education), which serve to trigger conscious awareness of the pertinent beliefs. Some versions of this model also postulate a "general health-motivation" variable.

The HBM has proved to be a fairly good predictor for a variety of health and sickness behaviors and to be useful for the planning and evaluation of health education programs (see reviews in 26, 27). Its significance arises from the fact that it attempts to delineate specific

beliefs that influence the way people act on health matters. Its difficulty lies in the methodological problems of formulating valid, reliable and standardized scales for measuring the several variables of the model (28).

Another model which specifies particular variables is Fishbein and Ajzen's Behavioral Intention Model (BIM) (29,30). This model, described by its proponents as a "theory of reasoned action, proposes that the immediate psychological precursor of behavior is the intention to perform that behavior. Behavioral intention is best predicted by the additive function of two components: 1) attitude toward the behavior which is determined by the product of a person's beliefs that the behavior leads to certain outcomes and his evaluation of these outcomes and 2) subjective norm which is determined by the product of the person's beliefs that specific individuals or groups think he should or should not perform the behavior and his motivation to comply with these specific referents.

The underlying assumption of relevance to nutrition education in these decision-making approaches is that one's mental preparation to act and one's perceived world underlie behavior. The relationships between these personal and perceived social variables can be conceptualized and the resulting models used to predict decisions or choices from among alternative behaviors.

The goal of nutrition education when these decision-making models are used can take either of two forms. One is to bring about desired decisions (i.e., behavior change) by manipulating variables in the decision-making process. The second is to improve the quality of people's decision-making skills so they can make their own decisions about nutritional behaviors in a competent manner. In this instance nutrition education would assist people to: 1) increase the number and complexity of criteria used in making choices among alternative foods or food habits, 2) identify the values implied by each choice, 3) weigh the positive and negative consequences of each alternative, and 4) make plans for implementing the chosen course of action. This second form of nutrition education would not attempt to influence the actual decision made.

Several health educators using this decision-making approach(11) have proposed that health education should consist of two phases. The function of the first phase would be to increase the competencies of individuals to make decisions about behaviors that are conducive to health. If individuals decide to adopt those behaviors, the function of the second phase would be to increase those skills and inclinations required to engage in those health conducive behaviors. Green et al. (31) have proposed a model, PRECEDE, for facilitating these behaviors in which "predisposing," "enabling" and reinforcing factors are addressed.

The models described in this section have yet to be used extensively in nutrition education research or practice. The HBM and its usefulness for nutrition education research have been described in detail by Hochbaum (27), Glanz (32), and Sims (33). A comparison of the conceptual strength and the predictive validity of the HBM and BIM for

preventive health care decisions is provided by Oliver and Berger (34). The HBM has been used in some nutrition studies (e.g., 35); the BIM has been used in one (36). No studies involving the SEU were found in the nutrition literature, although it is used extensively in consumer decision-making research (e.g., 37). These and other behavioral decision models (38) appear to hold promise for nutrition education research and their usefulness should be systematically investigated.

Group Dynamics. In addition to his field theory, Lewin also influenced social psychology by his studies of group dynamics. Using the concept of lifespace, Lewin proposed that when individuals function within a group they become a part of each other's lifespace. These interrelationships then influence the nature of group behavior. Lewin systematically studied such issues as group dynamics, leadership styles and social influence. From these studies he concluded that social action was more easily brought about by group action than by individual action. Today studies in this area are concerned with such issues as conformity, conflict, power leadership, and altruism.

The underlying assumption of relevance to nutrition education is that it is easier to change an individual's food habits by changing the values of the group to which the individual belongs than by changing each individual's food habits separately. The goal of nutrition education is therefore to change group values or norms.

Lewin himself studied the usefulness of this approach for changing food habits during World War II (39). He found that group discussion followed by public decision such as a show of hands was substantially more effective than lecture or appeal for change.

Attribution. The importance of causal attributions when choosing among alternative courses of action is becoming increasingly recognized (40). People seek causes and explanations for health and illness and act accordingly (41). For example, people often behave differently if they attribute the causes of events or conditions (e.g., obesity) to themselves (e.g., overeating) than when they attribute causes to someone or something else (e.g., genes).

The attributional process of over-justification also influences behavior. That is, intrinsic motivation for an activity may be adversely affected or undermined by administering rewards because receiving a reward for performing an activity (or eating a food) leads a person to overjustify his behavior: "If I am rewarded for doing (or eating) this, I must not like it." The consequence is a reduction of interest in, or liking for, the activity (or food).

In addition, attributions are important in the interpretation of physiological states or emotional responses. In Schacter's theory of emotion (42), the state of physiological arousal underlying most emotions (e.g., anger, euphoria) is postulated to be the same. The actual "emotion" a person experiences upon arousal depends on the explanation or cognitive label the person has for it. When an appropriate explanation is lacking the person will rely on external information or cues for the cognitive label for his feeling state. The label

applied can in turn influence the nature of subsequent action. Clearly, misattributions can occur, leading to inappropriate action or to inaction when action is needed. In the area of nutritional health such misattributions can obviously have serious consequences.

The goal of nutrition education from the perspective of attributional theories can be to assist people in making appropriate attributions on nutritional matters. This can enhance motivation and ability to make and implement decisions about healthful eating practices.

Persuasive communication. Persuasive communication, or the Yale attitude-change approach, is a set of postulates about how to bring about attitude change. This was originally developed by Hovland of Yale (43) and is now used widely in mass-media advertising. According to the persuasive communication approach, attitudes are influenced or changed by opinions or beliefs which, in turn, can be changed by persuasive communication. The following variables of the communication process must be considered when designing techniques to influence attitudes: the nature of the source of the communication, characteristics of the communication or message itself, the channel to be used (print, TV, radio, etc.), and audience or receiver characteristics. Four conditions are necessary if the communication is to be persuasive. The person must attend to and comprehend the message. The person must then cognitively and affectively accept, rather than reject, the arguments or conclusion of the message. Finally, the person must retain the message until the appropriate situation where the action suggested by the communication can be carried out (e.g., in the grocery store).

Theories for how a person is motivated to take the step from accepting and retaining a message to actual behavior are derived from other theories and research. For example, some communicators draw on reinforcement theory, others on modelling theory (from social learning theory) and still others on consistency theories. More recently the influence of the informal social networks on the receiver's response to mass communication is drawing attention. The persuasive communication process is increasingly seen as a complex one as more research is conducted (20, 44).

The underlying assumption of relevance to nutrition education is that an individual can be persuaded to act if exposed to appropriate communication techniques. The goal of nutrition education from this perspective is to persuade people to change their attitudes and behaviors towards food and nutrition. There are a number of examples of the use of persuasive communication in nutrition education, especially for mass-media campaigns such as the Stanford Three-Community Study (45).

The research methodologies used in social-psychological research, as indicated in Table 1, usually employ either controlled experiments or statistical analysis of cross-sectional data on large numbers. In these surveys the data are discrete elements of behavior such as coded answers to items on questionnaires and multiple-choice tests. Case studies may also be used.

No educational ideologies derived from social-psychological theories have been presented in Table 1. This is because these theories of behavior and behavior change have not generated a comprehensive educational theory. Instead, specific notions and strategies based on various social-psychological theories are used by practitioners as seems appropriate.

Conclusions From Analysis Of Theoretical Traditions

A number of conclusions can be drawn from the foregoing analysis of the various psychological and educational theories, their underlying assumptions and their implications for nutrition education. These are important as a source of direction for researchers as well as practitioners. The research designs for studies of various nutrition education programs must be attentive to the theories from which the goals of the programs are drawn.

First, the goal of nutrition education, when it is based on the behavioral sciences, can represent one of two different approaches. One approach can be to change, shape and/or maintain desirable eating behavior. The other can be to provide relevant knowledge and skills so that individuals can make their own decisions about nutritional health behaviors. The choice between these two goals is influenced by, if not dictated by, the choice of theoretical framework for our research and practice. Thus, the former goal is suggested by, or dictated by, the behaviorist or social learning theoretical base while the latter goal is suggested by the humanistic or developmental perspective. Either goal can underlie a nutrition education program based on social-psychological theories, depending on the choice of specific theory. Nutrition educators should be clear about their goal and then base their research methodology or educational strategies on a theory congruent with that goal. It is recognized, of course, that these two goals are complimentary with each being more appropriate in some situations than in others.

Second, the analysis laid out here can help to point to the variety of strategies from which nutrition educators may choose after the goal is selected. Let's consider an example where the general goal chosen is one of providing nutrition education in the context of individual choice. The nutrition educator needs to decide whether to: 1) provide relevant information in an accepting manner under the assumption that people are basically rational and good and will naturally adopt healthy behaviors, 2) provide experiential situations which will enhance people's cognitive and moral development so that they may become more capable of making complex decisions about issues of food and health, or 3) use some of the notions from decision-making theories to increase the quality of decision making. As another example, if behavior change is chosen as the goal the nutrition educator needs to decide whether: 1) the mental preparation to act <u>is</u> important and therefore choose to use strategies from persuasive communication, value-expectancy, consistency or social learning theories or 2) such cognitive mediating events are not important and therefore choose to use direct behavior change strategies such as behavior modification.

Third, this analysis can suggest which combinations of strategies are compatible. For example, if improvement of the quality of decision making is chosen as the goal of nutrition education, then the cognitive and moral development level of the selected population may suggest parameters for the level of training in decision-making skills that is possible. Nutrition education strategies will therefore need to call on developmental theory as well as expectancy-value theories of decision making. As another example, if behavior change is chosen as the goal, then techniques of persuasive communication can be combined with approaches based on social learning theory's emphasis on the importance of improving people's personal or self-management skills or with the various expectancy x value or attitude change theories. This might be done by including instruction on how to make the behavior change being advocated or by presenting cost-benefit considerations.

Fourth, evaluation needs to be congruent with both the selected goal of nutrition education and the theory underlying the strategies used. For example, if the goal is behavior change then behavior change is an appropriate outcome measure for evaluation. However, if improvement of the quality of decision-making is the goal then behavior change is not an appropriate measure. Instead the appropriate measure is the increase in the complexity of the decision-making process used by the recipient after the educational program, perhaps in terms of the number and nature of criteria and the strategies used for arriving at the decision.

Finally, and most importantly from the viewpoint of those of us gathered at this conference, the framework presented in Table 1 can point out directions for future research. Existing nutrition education research reports can be identified and analyzed to serve as examples of studies based on particular theories. The framework presented here can thus be used to identify gaps in knowledge and stimulate new research. Only as we pursue such a systematic approach through research can we discover which theories are heuristically most useful, with which groups of people they are most appropriate, and under what circumstances they are most applicable to accomplish the goals of a particular nutrition education program. This is what's needed to move us toward a framework for theory building in nutrition education.

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CASE STUDY I

MULTIMEDIA AND BICULTURAL APPROACH TO NUTRITION EDUCATION

Henry Breitrose

The research that I would like to report to you today is familiar to many of you. It derives from a program of research at Stanford University which was jointly conducted by the School of Medicine and the Department of Communication. I'm going to try to approach this research and the description of the research from the point of view of theory and methodology.

I mention the background of the research because I think it is very important that one recognize the background of the people doing the research. It was fundamentally an interdisciplinary project and the array of disciplinary and practical approaches used in the project reflect the biases of various disciplines.

Our particular group in the Department of Communication tended to work very much with Karl Popper's (1) model of scientific inquiry. I was pleased that Professor Walberg mentioned it, because fundamental to the way in which we think is the fact that theory and hypothesis testing go hand-in-hand. One derives hypotheses from theories and, indeed, the test of falsifiability with respect to a theory has to do with testing a derived hypothesis. You can't test a theory directly, or at least not from Popper's point of view. You can try to test a hypothesis that derives from the theory.

Our colleagues in the School of Medicine operate in a rather different experimental tradition. They tend to come out of what one might call a clinical background, a background of clinical trials. We had a number of rather interesting discussions having to do with attempting to harmonize these two rather different kinds of traditions and attempting to convince our medical colleagues that one indeed did need rather large populations with which to conduct behavioral experiments. I won't go into that in detail. I did want to point out, though, that I think there are some fundamental differences between the sort of experimental design that one finds in clinical medical settings and the sort of experimental design that one finds in the social sciences.

In any event, the research was planned and carried out by a large team of investigators, research associates and graduate students, each of whom brought his or her own special skills and contributed vast energy and extraordinary dedication. Many of you knew the late Janet Alexander. It is appropriate that I take note of her unique and very special contribution to the project. Jan's work at the level of fighting through an assortment of theoretical debates and coming out with reasonable operationalizations was something we all thought was absolutely spectacular. Her energy, her good sense and her very powerful analytical skills made the project possible, I think. Those of us who worked with her and those of us who knew her miss her very, very much.

Let me describe the study for those of you who are not familiar with it. In what has come to be known as the Stanford Three-Community Study, we took on the challenge of developing a community-based public health model for the reduction of coronary heart disease risk factors. The community-based health model is essentially an alternative to what we conceived of as the existing traditional clinical medical model. The clinical medical model typically tends to treat people. It tends to deal with people who are in fact at risk. Doctors very seldom see people who aren't ill or who don't think they are ill. And a typical in-house intervention that is done by a doctor or by doctors and paramedical personnel typically has to do with individual one-on-one diagnosis, counseling and prescription.

The problem of attempting to reach a very large audience or a very large group of people who exist in what are called free-living communities in a preventive mode was something for which we couldn't find a lot of documentation in the literature. In this particular piece of research we began with some notions about a desired outcome. The research, from that point of view, was designed backwards. The outcome that we wanted was a series of behavioral changes. In the design of the research we paid extremely close attention to constructing measures of behavior and determining physiological measures which could reasonably be inferred to be the result of behavioral changes. It may sound curious that one begins at the end in designing the particular piece of research but, since we were focusing on a very applied issue, the idea of beginning with the desired outcomes was of great importance.

What models did we use? Basically we defined the problem of effecting change in behavior as a communication problem. There is a theory (to call it a theory really dignifies it a bit much, but there is a general set of feelings, perhaps) of constructs afloat in communication research that says "There is a linkage between information, attitude and behavior." That was really where we were beginning. What we had to offer was information and perhaps some motivational devices. The outcome that we wanted was a certain behavior. Somewhere between our offer and our desired outcome there really ought to be a link. That was our "model."

We also began with a very naive but robust model about human behavior. The model says that, all things being equal, people will tend to behave in what they think is their own best interest. This is not a brainwashing model. It is not a hidden-persuasion model. It is not a subliminal model. It is a model that recognizes human beings as essentially rational people who fundamentally want to do the right thing. This was an a priori assumption, by the way, because we were in charge of defining "the right thing." Professor Walberg talked about values; it was a value judgment that we made. We chose to assume that this was the way to work. There were some discussions about this, as you might imagine. It is at this point, of course, that the issue of ethics comes into research.

We looked into the literature. The literature search, as was mentioned yesterday and again this morning, is an important part of

doing any research. It saves one the embarrassment of re-inventing the wheel. It also enables one to get lots of good ideas or at least increases the probability that one will get lots of good ideas (assuming that there are some good ideas out there, and I think that very often there are). What we found was an enormous amount of literature which told us why what we proposed to do couldn't be done. Most of the research reviews, especially Dr. Joseph Klapper's (2), were eloquent in telling why this couldn't be done, why the role of mass communications is essentially that of reinforcing existing values and existing information rather than introducing new values and new information.

One of the problems in looking critically at the literature about why it couldn't be done was understanding how that literature was derived. We could find very few instances of research built in as a fundamental part of a campaign from the start. What we were finding, we realized, were after-the-fact studies of failed campaigns. When something didn't work someone said, "Gee, I wonder why it didn't work?" and tried at that point to sort it out through data gathering or thoughtful analysis.

We found only one post-campaign analysis to be helpful, this one of a successful campaign, of what we in communications call the "Kate Smith Phenomenon." Kate was, as some of you remember, a popular singer who was phenomenally successful in selling war bonds during World War II through a persuasion campaign on the radio. Afterwards, a number of papers were written attempting to explain why radio, a mass medium, could be so successful in getting people to act in certain ways--specially to buy war bonds. One of the papers (actually a rather speculative article) was done by Dorwin Cartwright (3), who wrote an article called "Some Mass Persuasion." He thought through the kinds of changes that must be achieved in order to persuade. Cartwright said that first of all must come changes in cognitive structure; that is, what people know and what people understand. He said that is a necessary but not sufficient condition. Another necessary but not sufficient condition is change in affective structure, changes in motivation, changes in what people want to do. But Cartwright recognized that one may have changed cognitive structure and affective structure and still not have achieved change in behavior, not have achieved full persuasion. The missing ingredient, from Cartwright's point of view, was what he called changes in action structure. That is, one may understand the right thing, one may have the best intentions in the world, but the question is, "How do you do it?"

For example, one may know why it is good to give blood to the Red Cross and one may in fact be reasonably well motivated to give blood to the Red Cross, but if you don't know where the blood center is, or if it is extremely difficult for you to find where the blood center is, the probability of your actually giving blood is relatively low.

Cartwright pointed out that most campaigns, while they might succeed in changing cognitive and, indeed, affective structures,

typically failed to teach specific behavioral skills. They did not in one way or another promote or guide appropriate behaviors.

We therefore proceeded to design and implement a multimedia health education campaign in which the mass media were used to teach certain behavioral skills. We were also interested in comparing the outcomes of a mediated campaign with something that was closer to the traditional clinical and medical intervention. We knew from the theoretical literature on personal influence that interpersonal communication or personal counseling ought to be an exceedingly strong and powerful way of creating change in individuals, especially if it is done with group support. Thus, we were testing two sets of hypotheses, one derived from Cartwright's model and the other an interpersonal-intervention model. When we went into this we had no idea which, if either model would most powerful.

The experiment that I'll talk about this morning was accomplished over a two-year period in three California communities: Watsonville, Gilroy and Tracy. For those of you who are not familiar with these communities, Watsonville is the Artichoke Capital of the world, Gilroy is the Garlic Capital of the world and Tracy is Tracy. These are relatively modest-sized, I think, with populations of about 15,000, and are largely market towns in California. They were chosen because they were about as comparable as we could find from a demographic point of view and they were within easy striking distance of the University.

We began by defining a population of men between the ages of 35 and 59, drawing samples of approximately 20 percent from the population and finding out who these folks were, and what they were about. High-risk individuals in our samples were identified by looking at the multiple logistic function of risk factors (age, plasma cholesterol concentration, systolic blood pressure, smoking history and electrocardiographic findings) and selecting individuals falling in the upper quartile.

By and large we found in the baseline survey that people indeed did want to do "the right thing." They wanted to do what they conceived, though, as being best for them.

The cultural experience of Spanish-speaking versus English-speaking groups in the communities was fundamentally different. The Mexican-American or Chicano group consisted largely of recent immigrants and their children. They were primarily involved in labor of one sort or another. The Anglo group (in California we can divide the population between Chicanos and Anglos) was basically, first-, second- and third-generation speakers of English, and English was, for most of them, the only language. We found from the baseline questionnaire that there were very large differences in media consumption patterns, food behavior, health beliefs and several other important dimensions between the Mexican-American group and the Anglo group.

This suggested that the idea of going in with a series of instructional materials and just translating them into Spanish was madness because the value loadings and the references in the English-language materials were largely irrelevant to the Spanish-language group, especially at the level of diet. They ate different things.

In Tracy, which was our control community, we did absolutely nothing but the survey. There was no intervention at all. Tracy provided a good opportunity for us to look at what, if any, effect on health patterns there was of what one might call secular change--things that were going on in the society at large that would cause shifts in health-related behavior patterns.

So, taking Tracy out, we had two communities left, Gilroy and Watsonville. We declared Gilroy the media-only community, used only media interventions and conducted the annual surveys. In Watsonville we used the same media intervention but randomly selected two-thirds of the high-risk individuals in the sample and offered them some special treatment which we called "intensive instruction." This intensive instruction was essentially based on an interpersonal counseling model. The instructees and their spouses, regardless of their risk level, were invited to attend an assortment of intensive sessions in which they were told very directly how to reduce an assortment of risk factors.

In order to provide a measure of the effects of mass media in Watsonville, we created a theoretical sample called "Watsonville Reconstituted". We pulled the intensive-instructed high-risk individuals from the sample. Weighting sex-specific data from the remainder of the sample in order to preserve the ratio between the high risk and non-risk subjects, we were able to look at the difference between the intensive-instruction-plus-mass-media group and the mass-media-only group within that one town.

With respect to describing diet of our two groups, the first thing we needed was a questionnaire. As you all know, probably much better than I, there are all kinds of questionnaires and all kinds of models for questionnaires and, by and large, all questionnaires take too long to administer. There is also debate in questionnaire construction with respect to the kind of data for which one asks.

We developed a 47-item, close-ended diet questionnaire in very close collaboration with our staff nutritionist on the project and pretested it in Modesto, California, a community not unlike the experimental and control communities. The questionnaire was used for baseline measurement and again at the end of the first and the second year. It was designed to characterize the average or usual dietary intake of respondents. It was not designed to characterize their intake over a brief time period. One problem we recognized through this approach is that diet, especially in our state, tends to vary a bit seasonally. So we used a series of questions that asked them to make some rather broad estimates. It was our feeling that, since we were going to be doing the survey at the same time every year, these

characterizations, if they changed, ought to change as a function of shifts in what people did rather than as a function of seasonal shifts.

The questionnaire focused on what were thought to be rather specific issues relative to coronary health, that is to say: cholesterol intake, intake of saturated and polyunsaturated fats, refined sugar and alcohol. It also contained questions about the frequency of ingestion and usual portion sizes of all major food items containing significant amounts of these ingredients. Thus we were able to make at least some estimates of the daily consumption of cholesterol and the saturated and polyunsaturated fats for each participant.

We also conducted three blood surveys at baseline and again at one- and two-year intervals. The blood was analyzed for pretty much anything we could anticipate. Dr. Peter Wood, the lipid chemist who was in charge of this particular area of the project, had the foresight to take considerably more blood than we actually needed and to freeze a portion for each respondent. We were later able to do retrospective HDL and LDL fractions which we hadn't anticipated doing when the study was initially designed.

The interventions were of two types. The Intensive Instruction materials which were presented face-to-face by a health counselor and a dietitian occurred after the participants had an initial conference with a doctor who explained their high-risk status to them and helped them set targets for health-habit changes. There were nine Intensive Instruction sessions on diet, each from about one-and-a-half to three-and-a-half hours in duration. These occurred during the second year of the project. Early in the third year of the project there were several follow-up sessions. The counseling model that was used was fairly straightforward behavior modification.

The media intervention was an extended effort that derived from the baseline data. It would have been absurd to tell people what they already knew. So we asked a fair number of questions in the baseline questionnaire about existing levels of knowledge. We were also extremely interested in sources people used for information about health-related matters. There we found some extraordinarily significant differences between the two cultural subgroups in our study, the Anglos and the Chicanos. Let me describe some examples of where the baseline data was used in constructing media and discuss the theoretical rationale for doing it that way.

We used print media as one way of delivering our message. The purpose of the print materials was to convey relatively complex ideas, to give both action instruction and instruction having to do with cognitive process.

For the Anglo group we devised a document called the "Cook's Book," and subtitled "Family Food Guide to Heart Health." The nutrition information focused on the specific set of outcomes we were looking for. It was not a general nutrition book, although there was certainly nothing in the document that would harm anyone.

The first ten pages consisted largely of straightforward explanations of the relationship of saturated fats, sugar, salt and caloric intake to cardiovascular risk. We tried, in the writing of this material, to include very specific action statements rather than a statement of information or a statement of motivation. Following the Cartwright model, we tried to specify rather narrowly, and we hoped memorably, bits and pieces of action to follow. For example, we described how to buy meat, poultry, game, fish, vegetable oils, margarine, shortening and prepared foods. The whole thrust of another section was to tell people how fats are described on labels, how to read a label and so on.

We tried to suggest logical substitutions. It was pretty obvious to us that the kinds of changes that we were going to get were not going to be massive. We were not going to turn Watsonville and Gilroy into a collection of bean sprout and tofu eaters. The people who sat down to write this book began with the question, "What do people normally eat and what can a heart-healthy person do to come as close as possible to their normal diet?"

Finally, material was presented at the end of the book in a tabular way so that food preparers would be able to consult the book and literally take it to the supermarket. For example, ground meat was starred and there was a statement that said, "Ask butcher to grind lean meat for you or grind you own. Buy lean ground."

The Spanish-version book was called "The Traditional Diet and Your Heart." We did a certain amount of pretesting on this and found that at the time this study was done there was a significant resurgence of cultural pride within the Mexican-American community. We felt that it was perfectly appropriate to take advantage of that and to deal with the issue of diet on the basis that many traditional recipes in Mexican-American cooking are perfectly acceptable in terms of cardiovascular risk reduction with very minor replacements.

There were no recipes as such in the book. One thing we found in the Mexican-American community was that the household food managers (a term I had to learn), who were inevitably the women of the family, didn't use recipes. There was a discussion of traditional foods framed within the context that the old ways were the best ways. We began with the Indians, the Mayas and the Aztecs who cultivated maize, then got on from maize very quickly to frijoles and chili. This, by the way, was designed not to be read by most of the recent immigrants, because we knew that their literacy was marginal. What we hoped would happen, and indeed what we think did happen, was that this was read by the kids to the parents.

The artwork picked up this idea and continued to deal with food in the cultural context. Try to keep in mind that we tried to be as sensitive as possible to the cultural context. We got wonderful cooperation on the development of this from nutritionists working for the Santa Clara County Cooperative Extension Service. They are a group of absolutely splendid Mexican-American nutritionists who developed and pretested the material to make certain that it worked.

We used some other methods of reaching people, also derived from what we found out in baseline measures. For the Anglo community, for example, we found that the most important source of dietary information was the "Doctor Column" in the newspaper. In fact, we found that the only thing in the newspapers in these communities that was more popular than the "Doctor Column" was the astrology column. So we did a "Doctor Column." The "Doctor Column" was "Ask Doctor Farquhar" (Dr. John Farquhar was the principal medical investigator in the study). Answers were framed with the notion of giving action-specific directions: "What to do!" We translated the column into Spanish, making some adjustments for cultural differences. We then reprinted the column in a booklet using the front of each page for English and the back for Spanish so that we could reach people regardless of whether they spoke English or Spanish at home.

We were also interested in dealing with very simple sorts of messages. The best way of getting a simple message across is with television. In televison we again tried to operationalize the notions of Cartwright. Many of these had to do with replacements: "Instead of that, try this."

We developed a great deal of other material that I won't describe in detail. The media for the English-speaking community were largely written texts although we did a fair number of television spots. With the non-English speakers we found that reading was not the major part of their information-seeking pattern. They instead listened to the radio. So we did 5-minute "Radio Novellas" incorporating nutrition messages. Women in Mexican-American families in the community who worked tended to leave the radio tuned to the Spanish- language station all the time. It was a most important source of information about the world. There is also a long tradition of drama in the Hispanic culture which we built upon in the choosing the novella format. It was a recipe show depicting the continuing adventures of Chef Romero and his friend who discuss good nutrition and make jokes in an engaging and entertaining way.

The major results, indicated that the Cartwright model, which suggests approaches focused on changes in action structure, had some power. There were significant reductions in reported cholesterol consumption, reported saturated fat consumption and plasma cholesterol levels over the project's three years.

We are not clear on the relative power of the media versus media-plus-intensive-instruction models. We have some thoughts that what happened in the media-only group in the second year was that people began to develop, in conversations with each other, their own interpersonal networks. They were therefore receiving support from each other in a two-phase model similar to intensive instruction. We are puzzled enough about this to think it warrants further research which looks at the role of informal interpersonal reinforcement in health promotion, an approach that could certainly be more cost-effective.

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CASE STUDY I DISCUSSANT

THE NEED FOR BICULTURAL AND MULTIMEDIA APPROACHES

Johanna Dwyer

I thought I would spend about ten or fifteen minutes discussing, first of all, why we need bicultural and multimedia approaches. I am going to argue that cost effectiveness is one of the reasons we need these approaches.

Dr. Breitrose has given us a very interesting description for our first case study. We saw that cultural differences are important, not only in describing health-related characteristics and knowledge, attitudes, practices and the like of various groups, but also for selecting the media with which we are most likely to be able to get attention and behavior change. Therefore, if we are to convey information and if we want to change behavior, it is going to be necessary to pay attention to bi- or multicultural approaches which may differ from one target group to the next. We were given a nice small example of this in Dr. Breitrose's presentation. These approaches pay off. And aside from many other advantages one can talk about, such as sensitivity, here is also a rationale from the cost-effectiveness standpoint.

The communication of information in education will be less efficient if one doesn't target the message and take account of cultural differences. Therefore, segmentation of the target group by these and other characteristics--such as risk characteristics--is important. By segmenting the target group in these ways, we can identify meaningful homogeneous groups and better influence behaviors within these subgroups that are of importance to health. Moreover, these approaches can help us learn more about target-audience goals, objectives, etc. That is, techniques which pay attention to bicultural and multimedia approaches increase the probability that messages will be linked to audience concerns, lifestyles, objectives and the like. This will help us convey these messages in ways which are likely to be received. Efforts which don't consider these concerns are unlikely to be effective. Even though we can't promise that those that do pay attention to these concerns are going to succeed, they do stand a better chance of doing so.

Role models are also important. I want to mention an article which I saw very fleetingly a couple of days ago and which I think is important for some of the points I will be discussing about the case study in a few minutes. This was a lead article in the New England Journal of Medicine. The University of Pennsylvania studied the content of a whole series of television programs from the standpoint of the lifestyles, that is, the characteristics and behaviors of the people in the programs. The programs were filled with examples of people who overate, overdrank, oversmoked and underexercised and yet never became obese, alcoholic, emphysemic or flabby. Given these models and the seemingly lack of adverse consequences, it comes as little surprise that many Americans disregard dietary warnings.

If you have ever been sick and had to watch the soap operas, you know people on the soaps eat all the time. They all have their hair up in curlers and are eating and drinking continuously. In spite of all these behaviors which are probably the antithesis of the advice that health professionals give, the TV personalities rarely die; if they do it's a national event. The basic point of the article is that such TV programs are good indicators that the role models in the mass media contradict messages about health promotion and disease prevention. The article concluded that this discrepancy is most unsettling for anyone in the health professions.

Now I would like to make some specific comments about the Stanford Three-Community Study as a powerful example of good nutrition education research conducted by non-nutritionists. I'd like to draw about ten points from that study and conclude by mentioning a couple of other studies that I think merit your interest.

The first point is that the Three-Community Study involved the testing of an interesting hypothesis from the biomedical standpoint. Even if the theory behind the communications model had collapsed and there were no effects, some very interesting things would still have come out of this study from the standpoint of application of biomedical knowledge. I'll come back to that later as something that I think is important from the viewpoint of strategies to apply in nutrition education research funding.

Second, the study illustrates a concept which had evolved in the 1950s and 60s in relation to many of the chronic degenerative diseases that multifactorial interactive risks were involved; you couldn't say that only one cause was responsible. Thus the Stanford study focused on many changes in lifestyle, not exclusively on diet. The rationale for multifactorial intervention comes from data such as had been collected by the U.S. Public Health Service in the Framingham Study. The Framingham data show the probabilities of developing coronary artery disease in large groups of men associated with various characteristics or behaviors. If we look at male's serum cholesterol levels in relation to other modifiable risk factors such as blood pressure, smoking and the like in different combinations, we see that different probabilities of an atherosclerotic event emerge which can be predicted for groups, although not for individuals. The question this answers for those who are planning interventions is that it makes no sense to intervene on only one risk factor alone. It is more sensible to try to design intervention strategies which concentrate on most or all of the major risk factors.

It is my understanding that in both the Three-Community Study and a number of other clinical trials like "Mr. Fit" (e.g., the multiple-risk-factor intervention trial of the National Institutes of Health) it was thought to be more productive to intervene on many things together. But one pays a price to do this in terms of cause-and-effect relations. In these designs it is hard to separate out the effects of various interventions.

A third aspect of the Three-Community Study that was interesting, in my view, was the communications research hypothesis. The message today might differ slightly from that of a decade ago, although in my judgment the message which was communicated remains valid in most important respects. The basic point I wish to make here is that decisions about what the message is to be complicate these kinds of experiments.

A fourth point I'd like to make is that the case study is an interesting test of two plausible biomedical and communications hypotheses. The whole notion of the utility of a community-based public health model rather than the conventional acute treatment medical model for the prevention of coronary heart disease was one that still was rather novel in the early 1970s. So there were a lot of things which were worthy of study from the biomedical standpoint. The communications hypothesis was equally fascinating. The Three-Community Study was one of the first big studies where small steps in behavior change and the notion of segmenting target groups by culture as well as by risk factors were tested. Moreover, novel mass media presentations were used. So this is a landmark study in the history of nutrition and health education. Explicit and worthy hypotheses were tested.

A fifth point that this study illustrates which is instructive for those of us working in the nutrition education field is the need for top-flight people across disciplines. Many studies in this field suffer in that they couple a good investigator in one area with a poor one in another. The Stanford group was top-flight across the board.

A sixth instructive point is that the study shows that it is difficult to change food habits without changes in food composition but that it is not impossible. In the early trials of the diet-heart hypothesis which preceded the multiple-risk-factor intervention trials, the people in the studies were given special foods to eat. There is no doubt it is a lot easier to get dietary changes if you have a food supply or products in the food supply which make it easy for the consumer to conform closely to whatever the educational messages are. The Stanford group used only foods in the supermarket. The changes they report are therefore all the more impressive.

A seventh point the study illustrates is how extraordinarily difficult it is even to test rather simple hypotheses in community settings. To come up with any changes which are of statistical significance, of significance for theory building or, more important, of significance for health is very hard.

The eight point is on the politics of getting nutrition education research funded. This research was funded from the National Institutes of Health (NIH). It is not always easy to get research of this type funded. The sections of NIH funding this work tend to be oriented to biomedical and disease-related disciplines. The Institutes are named after diseases, although health is the goal, because most of us worry about health only after we fall ill. There is more political support

for naming an institute after a disease than after a "health" and there is also a tendency to regard health from the disease specialist's orientation. Proposals which involve behavioral medicine, community interventions, health promotion notions and the use of mass media are not typical of the usual proposals NIH receives. Often special study sections are necessary to review these grants fairly from all perspectives. It is a credit to NIH that over a decade ago it invested grant monies in this worthy project. Nutrition education research projects such as the Stanford Study face difficult battles in terms of funding. I'm delighted that this one was funded and that it is already completed.

The ninth point the case study illustrates is the size of changes which are possible. Even with success, and certainly this study does report very dramatic changes in some areas, the changes are small compared to what naive people expect if they are looking for the proverbial "silver bullet" or total cure. Changes in most lifestyle variables are small and slow in coming. It would be wonderful if we could develop "silver bullets" or drug therapies which would reverse the pathologies that result from our lifestyles, but these do not seem to be imminent. We must continue to search for them, of course, but without slighting community and behaviors studies.

My tenth point is that the study illustrates the rewards of interdisciplinary studies. However, it is also true that when research projects have multiple disciplines involved there are usually problems of interdisciplinary cooperation. There are theoretical camps in nutrition, in nutrition education and in anti-smoking, for example, of which outsiders may be unaware. The more disciplines involved the more difficult it is to find something that all the grant reviewers can agree upon and the easier it is for subspecialists to find fault.

I'd like to be allowed to make a few niggling comments about techniques. There are some problems that I think could have been overcome at Stanford in terms of measuring food consumption; stronger measures of food intake could have been developed and could have been closer to state-of-the-art. Other techniques such as the use of micromethods for some biochemical measures (e.g., fingerprick blood samples instead of venapunctures) could have been used. It would have been much easier to do these studies if micromethods for analyzing high density and low density lipids and the like had been available.

Finally, there is the money issue. These studies are very costly. To talk about theory building in nutrition education without assuring that such studies are also important for biomedical and public health research is foolishness -- they simply are not going to be funded. There simply isn't support for nutrition education theory building in the funding sources that I know about, so such theory building has to be built into other proposals with purposes relating to issues the public cares deeply about.

In conclusion, I want to mention another useful case study to consider. Dr. Pekka Puska of the Keralia Project in the Keralia province in Finland has recently reported findings similar to those in the

Stanford Program. The Finns have gone longer with somewhat different interventions but the basic intervention is pretty much the same. The Finns have been able to demonstrate not only changes in interventing or "soft" variables, but also in "hard" outcome variables. In terms of mortality and morbidity they are able to get some changes which are impressive. This, of course, is the ultimate dream of those who do community studies. As the economist Keynes said, "In the long run we are all dead but the question is what happens before we get there."

CASE STUDY I DISCUSSANT

THE FUNCTIONS OF THEORY

Peter Miller

This conference is about theory. We probably have 50 different definitions of what that is in the room right now. I'm not going to try to add another. I want to instead leave it undefined and talk about the functions of theory as I see them and how the Stanford project illustrates these different functions.

In my view, the first function of theory is as a collection of ideas which direct inquiry, which tell you what to look for in your research. Now, in the Stanford project one of the things that directed inquiry was a review of literature on mass communication effects. Dr. Breitrose talked about Klapper (Joseph Klapper, author of The Effects of Mass Communication), talked about Doc Cartwright's work and talked about the necessity for targeting messages to different audiences. Those are all ideas that come out of mass communication research. I would argue that the ideas are probably more rumor than theory. There is probably less evidence for those ideas than we would like to have. The notable thing about the Stanford program, that media seem to have an effect, may not be particularly surprising because I'm not certain the foil to which they were compared (i.e., Klapper's early work) was particularly strong.

Nothing we do as researchers is completely inductive. We always have some guideposts to tell us where to look, what questions to ask, what kinds of ideas to investigate. The more specific and explicit are those ideas, the better. That is what theory building is about. In the Stanford example there was also another type of theoretical decision. They were using nutrition education, not per se, but for something: for cardiovascular disease prevention. Nutrition education for cardiovascular disease prevention is probably different from education to prevent colon cancer. As Henry points out, nothing the Stanford researchers told their audience would hurt them, but it might not help them to avoid other sorts of diseases. If you are trying to construct theories in nutrition education, you have to take into account what sort of health goal you have in mind. I'm not sure it makes sense to talk about "nutrition education" without specifying the educational goal.

Another important theoretical decision made in the Stanford study was also determined from the literature. That was a need to compare media presentation with interpersonal influences. That guidepost comes out of a long series of "rumors" in mass communication research. It is an expensive and an important theoretical statement. It said you can't rely on media alone. There are two or three interpretations of it. What Cartwright meant, when he said that, is interpreted to mean you have to tell people how to behave. Maccoby's work seems to suggest that you need interpersonal contact in addition to media in the information campaign. Henry Breitrose this morning seemed to be saying that the media should tell the audience explicitly what behaviors to undertake. As a theoretical guidepost, Cartwright's dictum, that we need to tell the audience explicitly what to do in information campaigns in order to

achieve desired effects, is somewhat problematic. It can be interpreted in a number of ways. And different research strategies can be addressed to those different interpretations. The Stanford project reflects the ambiguity of Cartwright's general statement.

I have reviewed the first function of theory: to direct the researcher to questions for inquiry. The second one is to tell you how to go about the inquiry. This is one area where we in the social sciences have really not made very many advances. We need to specify the links between the concepts in which we are interested and the measures we use to assess them. We need to say to ourselves, "How could that measure be wrong? How could that measure not get at a description of that concept? What effects will that error have on the test of the theory?" The Stanford group provides an interesting example of this.

At the beginning of the Stanford study they drew blood from people and analyzed the blood cholesterol levels. They did the same thing in a later second and in a third survey after certain interventions. Essentially the Stanford study rises or falls on whether or not cholesterol levels are reduced. They also asked people to report what they ate and calculated, using different formuli, how much cholesterol there was in the stuff that they were putting into their bodies. Those are important steps because they illustrate the need for doing multiple operations to describe a concept. We need that kind of research work.

In one case, they envisioned a probable error in the measure. When blood was drawn at Time One, people were, and I can't remember which, either erect or lying down immediately previous to that time. As a result, the Stanford people argue, the estimates of cholesterol that they get are under-reports of what was actually in their bodies. If you buy the notion that those were under-reports, you also buy the notion of dramatic changes (reductions) over time in the Stanford study. If you don't buy that notion, you still have changes in the right direction but they are much smaller. That kind of comparison needs to be built in when we are talking about theory building. If we had one measure for all the concepts we're interested in and if we all agreed to use it, we wouldn't have to worry about measurement error. But we have lots of measures, all of them have errors in them, and we need to start to anticipate in our theories what those errors are so we can better compare results across studies.

The third function of theory that I want to point out is that the theory should tell us, once we have done a study, what happened. How did we get here? What was the process? And how will we communicate that to others?

Dr. Dwyer has pointed out that this was a big study. Well, there are even bigger ones going on now at Stanford and at Minnesota, big ten-year projects, spending millions and millions of dollars. They all have remarkable numbers of complex interventions going on. It is very difficult (as anybody who is involved in a big study knows) to tell your readership about all the details, the measures, the interventions, the media used, the formative evaluations, etc. But at the same time, in order for you and me as people interested in nutrition education to

build theory, we have to know that sort of detail. We have to have some notion of the measures which are used and how they relate to the concepts and objectives of the research. Theory can help researchers decide what is most important for sharing with others, because only the researchers themselves can make those final decisions and they need guidance.

I heard a lot of flagellation last night about whether nutrition education has any theory and about whether it should have any or not. Should we borrow or shouldn't we? My goodness, I'm not very accustomed to nutrition education, but I have been hearing the same arguments for years in other fields. So, I wouldn't feel too badly if I were you about the state of knowledge in this field. Any field which is applied, which derives from the so-called more basic fields, is going to have these problems. There are problems of status and there are problems of basic spadework not having been done. Just as an example, relatively few of us, I think, would be in this room talking about nutrition education if we didn't think it would do some good somehow. There is an applied goal to that. As a result we tend to do research which is in an applied context. And basic spadework such as that about measures connecting to concepts doesn't get done.

The problem here is that funding agencies are not interested in funding methodological research--let's say, for example, on the validity of reports of food consumption--unless it is connected to something else. That's the bane of working in an applied area. There are some areas in health, where planned methodological research has been going on for 20 years, where we know that certain kinds of health variables are under-reported and certain other variables are over-reported. We now can adjust for those errors in research which measures those variables. That's the kind of work you need to do as you start to develop theory--to start to understand what kinds of measurement errors there are in various knowledge, attitude and behavior variables and how to build this knowledge of measurement error into the theory.

Let me return to the Stanford example to illustrate this third point about how theory should help interpret what happened. The theory should be constructed in such a way (and you have heard this six times this morning) that some finding can be inconsistent with it, that it can't always be right. It can't be so general that any finding would support it. It also should identify logical alternate explanations for findings.

One of the things that you may not know is that in the three cities where the Stanford study was done roughly 60 percent of the people who started the study stayed in it. That means 40 percent moved away or said, "I'm not going to do this any more." Now what does that really say? It may say that the people who stayed in the study are a group of people who are going to show effects because they want to show effects. The Stanford researchers noted this problem. People involved in public education must realize that such education research projects are likely to involve a panel of people. When this is the case, there is going to be panel attrition. How can we as theory builders conceptualize that attrition, take it into account when we look for knowledge or behavior

changes? That's an important lesson of this study: we need to be able to construct theories which provide for the errors which crop up (in the case of panel attrition, non-response error) when we try to test them.

One way you can do that is by measuring the process of the experimental intervention. I'm impressed by the number and sophistication of the media materials that we have looked at this morning. But it seems to me that what Stanford did in some ways was simply to jam a lot of media all at once at the people in the study. That's a pretty good idea, I guess, but do you have to do that? Could you use only one medium? Could you just send pamphlets? It would be nice to have answers to those questions from an efficiency point of view. As things stand, I'm not certain what the nature of the media intervention was. Measuring the process of that intervention would give some clues to that.

Communicating that kind of information from a large study is very difficult and time-consuming to do. Since the Stanford group is in the middle of the five-community study now, it just doesn't get done. We as practitioners who want to set up an information campaign don't know exactly what lessons to draw from the Three-Community Study. We know we have to do a baseline survey, but after that the Stanford effort appears ad hoc. That may be all we can say at this point. It would be nice to have those process evaluations as well.

I'll conclude by saying again that the more you get into basic fields to look for answers to questions in nutrition education, the more you will find, as Dr. Dwyer pointed out, disarray, disagreement and confusion over basic findings. I find this all the time because I do both survey methodology and mass communication research. Both are applied disciplines and both try to pull from psychology, sociology and related areas. If you look to the non-verbal specialists to tell you something definitive about the differences between phone and personal interviews, for example, it isn't there. You can't find it; you get disagreements. So I wouldn't be too upset about the level of theory building in this field as it stands now. We all have a long way to go. Thank you.

Question-and-Answer Session

Thank you both. Are there questions from the audience or comments from Dr. Breitrose?

Dr. Breitrose:

Basically, I want to agree with Professor Miller that doing large-scale field research is very expensive and exceedingly sloppy in the sense that it is nowhere nearly as controlled and as elegant as bench research. Dr. Dwyer also pointed that out. Bench researchers don't understand this. Part of the politics, it seems to me, of funding for this sort of research or any social research in biomedicine or related biomedicine has to do with an ongoing war between the bench chemists and everybody else. Quite frankly, there is no way one can do these studies

their way short of kidnapping and perhaps incarcerating participants. There is no way that one is going to be able to prevent attrition over a two-year period. We felt very lucky indeed that we ended with only 60 percent attrition.

Drawing two or three vacuum containers of blood does scare people off a little bit. We tried as well as we could in this area. As Professor Miller pointed out, the results were confounded by the differences between what we later found out about cholesterol readings from reclining vs. persons in a standing position. So we adjust for it and we do the best we can. My point is not to disagree with what you said, but rather to underline the fact that, to a certain extent, this kind of methodological inadequacy which drives the bench chemists "bananas" is indigenous to applied social research of this sort.

CASE STUDY II

FOOD PREFERENCES AND EATING PATTERNS

Leann Lipps Birch

This morning you were exposed to a lot of "large sample" research. This afternoon I'm going to talk about what I would call small sample research--in more ways than one, as you will see when you become familiar with some of my subjects. What I'm going to try to do today is present an overview of the research program we have been conducting on food preferences and eating behavior and try to use the program to demonstrate the interplay among theoretical assumptions, hypothesis testing, data collection and the kind of feedback systems that get set up. Because I want to present an overview, I'll try not to get bogged down in methodological detail.

In one of the required readings for this conference, Travers pointed out that even those investigators who maintain that they are very empirically oriented and who prefer to stay very close to their data bring a particular disciplinary orientation, research methodology and set of implicit assumptions to their work. What I would like to try to do today is to give an illustration of how these orientations and assumptions influence the development of a program of research.

As a graduate student in psychology at the University of Michigan I was interested in cognition and attention, particularly the development of attentional processes. My dissertation work was on the development of attentional processes in children. When I came to Illinois and decided to start doing some work on food preferences, I thought this change was a radical departure from my previous research interests. In fact, in retrospect I can see it wasn't a radical departure at all because the initial question I asked was really an attentional question. As we go along, I think you'll also see that my initial question was a rather naive one but it seemed reasonable at the time.

In asking this question about factors influencing the formation of food preferences, I was interested in a very restricted kind of situation, one where food was presented to a young child. I asked to what extent intrinsic characteristics of foods themselves determine whether or not the child will like and consume those foods. I was very much concerned with characteristics of foods (e.g., aspects of taste and texture) as a stimulus for ingestion. Any of you who have spent time feeding young children know that placing the food in front of the child is not sufficient to insure the food is going to be consumed. All sorts of other things can happen to that food.

In order to begin this work I looked at the literature, as every dutiful researcher does, and found little that was of help to me. A lot of research on food habits and food behavior in children is based on maternal reports of children's consumption behavior. Several

authors who had written the papers in this area went so far as to say, "We relied on maternal reports because kids can't tell us about food preferences; they can't give us good, reliable information." So one of my first tasks was to come up with a measure of preference that would yield reliable, valid data in terms of predicting consumption patterns and that could be subjected to some analyses I was interested in doing.

To this point you can see that I have made several assumptions about young children and the nature of the psychological processes underlying their preference judgments. Let me now try to be explicit about some of these assumptions. First of all, I had some pretty firm beliefs that even very young children could communicate about their affective reactions to foods. The second assumption was that the salient determinants of preference (i.e., the perceived organoleptic and visual characteristics of foods) were perceived, weighted and combined by the individual and that the process resulted in a preference judgment. The third assumption was that there was a direct relationship between preference and consumption and that preference was a primary determinant of consumption for young children.

What I would like to say now is that the first and last assumptions have appeared to hold up better than the second assumption in the light of the data. The first assumption regarding children's capacity to communicate about their affective reactions turns out to hold up rather well. Their facial expressions communicate a great deal. Three- and four-year-olds can also communicate verbally about what they like and don't like. Based on this we've proceeded to develop an assessment procedure.

Before I describe that procedure let me talk a little bit about the analytical procedures I had decided to use on the data because I think it is important in terms of our discussion today. I had planned to collect the data in such a way that I could use some multidimensional scaling analyses in order to extract, if you will, perceptual dimensions of foods underlying preference. This multidimensional scaling procedure is designed to provide a spatial model of the relationships existing among the stimuli and subjects in a number of dimensions. I felt that this procedure would be particularly useful in this case because it would allow me to infer the dimensions underlying preference from the analyses of the preference data alone. Though children can to some degree communicate their affective reactions, they are not yet particularly verbal and are not very good at answering questions such as, "What intrinsic dimensions of foods are contributing to your judgments?" But even though multidimensional scaling analysis of preference data has been very useful to me, I want to emphasize that when one adopts such a method one also adopts a set of assumptions about the nature of the organism and the psychological processes underlying, in this case, preferential choice.

Without belaboring the details of the assumptions made by such a model, let me say that the model assumes that individuals, when asked to make preferential judgments about a set of stimuli, analyze those stimuli into dimensions, assign weights on each of the dimensions,

combine these in a weighted fashion and so on. These may or may not be reasonable assumptions regarding the nature of the process so, even though you may get a nice, convenient representation of your data, it may not be an appropriate representation in terms of the processes that are going on within the organism.

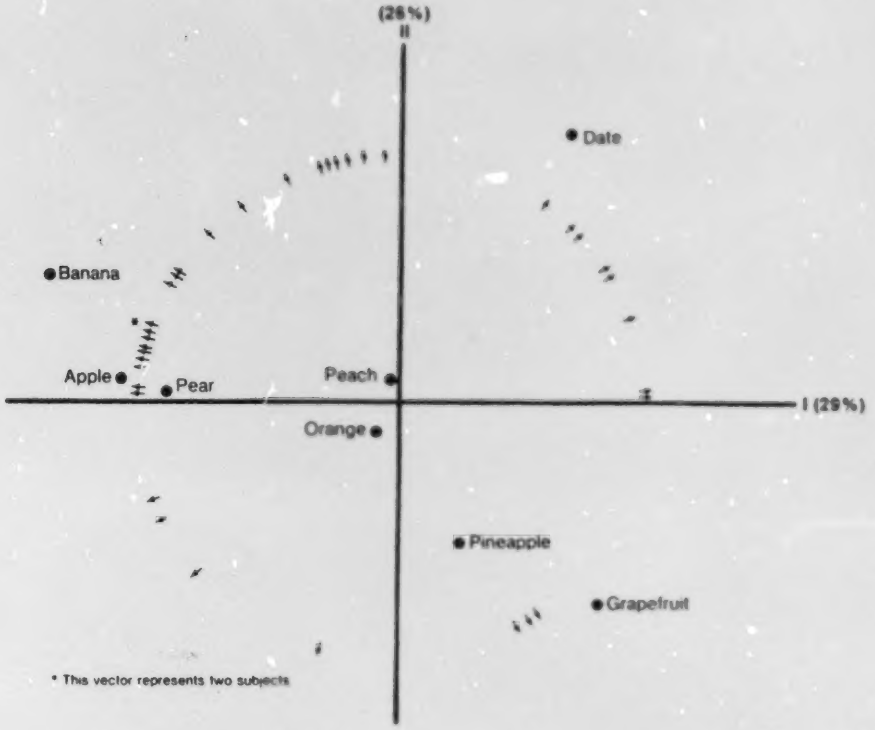
The assessment procedure itself is preceded by a careful training session. We use pictures of faces for our "instrument" and need to be certain the children understand the meanings of the faces.
One face is designed to depict someone who has just eaten something that was not liked, one face has a neutral expression, and one is designed to depict someone who has just eaten something which was liked. Even most three-year-olds don't have trouble with the affective meanings of these expressions.

Following training, the kids are presented with actual samples of foods because again there are problems with verbal labels, particularly with young children. The children are asked to taste these foods and to put them in front of the face corresponding to their affective reaction. This procedure is then repeated until all the foods have been tasted and categorized. Once we get the foods categorized we then have the children go back and rank order the foods within each of the categories so that ultimately we wind up with a complete rank ordering on the set of stimulus foods. This procedure is necessary because it gives us both relative data on liking of items and absolute category data. For example, Audrey and I could rank order a set of items identically. But I could place them all in the dislike category, and she could say that she likes them all. If you didn't have this category information you couldn't distinguish between us. It is really essential to have both kinds of information.

Figure 1 on the next page, as published in my article in The Journal of Nutrition Education 11:78, 1979, shows an output of one of the multidimensional scaling analyses employing the MDPREF program, a computer program for multidimensional analysis of preference data (1). A vector model is employed here, so each one of the vectors represents one individual. This is a partial model in which an individual vector's orientation represents that individual's relative weighting of the dimensions generated by the model. In addition, things that are close together are more similar than things that are farther apart in this representation. For the set of fruits used here there are two dimensions which account for about 55% of the variance in the preference data.

I should indicate that while the program gives you dimensions and places the individual stimuli in the space it does not label the dimensions for you. In this analysis I couldn't immediately label the horizontal dimension, but the second one, the vertical axis, looks like sweetness. If you project the food items onto that second dimension from top to bottom, the order of projections is date, banana, apple, peach, pear, orange, pineapple and grapefruit.

Figure 1. Multidimensional analysis of preference data for the total sample (n = 37) showing a geometric representation of relationships existing in the data



To verify this interpretation as sweetness, adults were given the same set of stimuli and asked to rank order them on sweetness. The ordering was the same as was obtained on the projection on the second dimension of the multidimensional scaling solution. I was, therefore, pretty confident that sweetness was the second or vertical dimension.

The first dimension was more troublesome. In this case, if you project the items onto that horizontal axis, you will see that the ordering is from banana and apple through to date and grapefruit. It turned out that once we looked at the food histories on the children and the children's ability to label the foods, we found that the first dimension appeared to be "familiarity" or "experience" or "exposure." I didn't realize the implications of this at the time, probably due to the particular orientation and set of assumptions under which I was operating. I collected more data with different foods and different children and kept getting this same "familiarity" dimension. Let me

remind you, parenthetically, that familiarity is not an intrinsic characteristic of a food at all, but rather a function of the individual's experience with food.

At about that time in the development of my long-term research program I decided it was important to get some data on the relationship between the preference measure and actual consumption in a self-selection setting. As a result of that experience we now almost always collect consumption data in addition to preference data. We did some studies of both preference and consumption data with kids for the same food items to determine how well preference predicted consumption. In one study, referred to as the "Cocktail Party Study," we brought the children in for special snacks. We had a table with an array of open-faced canape sandwiches, and they had eight different kinds of spreads on them. Spreads included, for example, peanut butter, butter, cream cheese, mint jelly, cheddar cheese and caviar. Then we simply allowed the children to self-select their snacks from among the set of canapes. The children were told, "Here's a plate and a glass of apple juice. Go and take as many of the sandwiches as you want. If you finish those, then you can have more." We carefully monitored what the children ate, the order in which they ate and how much food was left on the plate.

The study seemed to be going well until one day while I was observing the kids I noted that one child would get up and get more sandwiches and the next child would get up and get more. Or one child at a table would stop eating and the child next to him would stop eating. One child would say, "Boy, I really like these," and eat some more, and then the next child would say, "Boy, I like these too, I'm going to eat some more," I thought, damn it, they're really doing terrible things to my data. One child's eating behavior is clearly influencing another's. This kind of thing had no place in my way of thinking at the time about factors determining preference. I still felt rather certain that intrinsic characteristics of foods were the most important determinants of consumption. We have since, of course, observed a lot of mutual modeling in the children's eating behavior in, for example, the lunch program at the preschool, providing a lot of day-to-day examples of possible effects of peer models on the development of food preferences and eating behaviors.

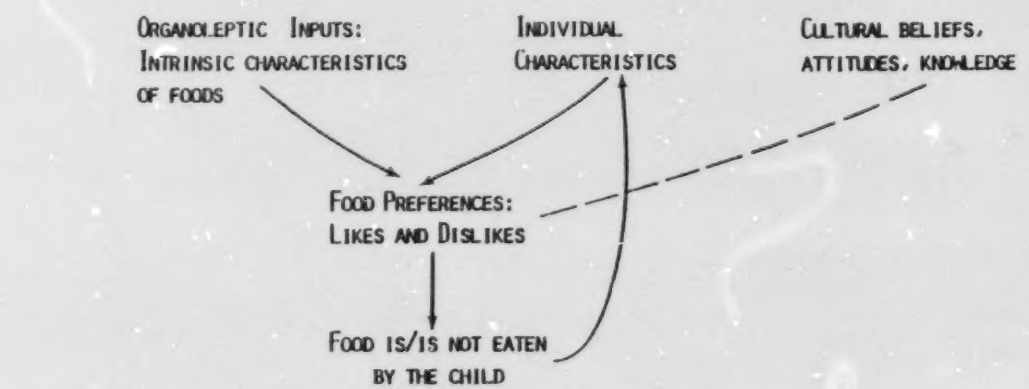
Finally there was an accumulation of evidence, including the repeated emergence of the familiarity dimension and my observations of the effect of peer modeling, that forced me to change my thinking and reorganize what I thought was important in the development of food preferences and eating behavior. I began to think that perhaps I ought to pay attention to the social context and effects of experience; that, in fact, those were the things I ought to be studying. It took "getting hit over the head" with a number of sets of data before I began to see that, "Gee, maybe I'm not looking at the right things; maybe I ought to reorganize my thinking. This simple notion that I had about preferences being determined by intrinsic characteristics of foods is really not appropriate and needs to be revised and expanded."

Certainly I would say that food's intrinsic characteristics are important, but it is clear that they cannot account for all of what's going on. In humans, learning and the context in which early experience with food occurs have major effects on the formation of food preferences and eating behaviors.

I should point out that despite all the social context effects that I informally observed in that study and that subsequently led to a series of studies in the research program on the effects of social context, the relationship obtained in that early study between preference and consumption was quite strong. When I correlated preference and consumption, the correlation in that particular study was .80, higher than that typically obtained for adults when the same measures are correlated. I think there are reasons why we obtain higher correlations with young children. Kids are not necessarily concerned about other factors that do influence adult consumption, including caloric content, cost, how difficult foods are to prepare, etc. Once the food is there and available for consumption, preference is really very important to the child.

In Figure 2 I have presented a simple model I developed for my own purposes to help my thinking about the determinants of consumption. Here the concern is with whether or not a food will be

Figure 2. A model for determinants of food consumption of children.


GIVEN THAT A FOOD CHOICE IS MADE BY THE ADULT CARETAKER AND THE FOOD IS PRESENTED TO THE YOUNG CHILD, WHAT DETERMINES WHETHER OR NOT THAT FOOD WILL BE EATEN?
ORGANOLEPTIC INPUTS: INTRINSIC CHARACTERISTICS OF FOODS
INDIVIDUAL CHARACTERISTICS
CULTURAL BELIEFS, ATTITUDES, KNOWLEDGE
FOOD PREFERENCES: LIKES AND DISLIKES
FOOD IS/IS NOT EATEN BY THE CHILD

consumed once it is made available to the child. This model is less complex than the sort that would be necessary to account for the determinants of food consumption in an adult. In fact, one advantage of studying young children is that the entire system seems to be less complex than trying to determine reasons for food choices for adults. I have left organoleptic inputs in--I certainly didn't throw them out the window--and I have also included something called "individual characteristics."

If I were to redo this model now I would probably have an explicit component that is now subsumed under individual characteristics that would have to do with experience. Dotted lines are drawn from cultural beliefs, attitudes, and knowledge to food preferences because these things are gradually being acquired during early childhood. I want to emphasize that these are acquired; a lot of learning takes place regarding the meanings of food, the purposes of eating, what to eat, etc., even in the absence of any explicit nutrition education, and this acquisition process goes on all the time. A lot of information regarding food and eating is in place by the time children reach school.

When I talk about individual characteristics I mean such things as health status that influence consumption. For example, if you feel sick you probably don't have much of an appetite. Anorexia is a major symptom of most illnesses. How hungry you are, genetic contributions to sensory ability and innate preferences would all be included in this component of the model. There appears to be an innate preference for sweet; investigators have talked about it as being an unconditioned stimulus for consumption, as a matter of fact. Finally, I would include the experimental history of the individual under individual characteristics, including the quantity and quality of exposure to, and familiarity with, food. The association of emotionally charged presentation contexts with foods, e.g., acquired preferences and food aversions, would also be included here. The clearest example of an acquired preference is the case, actually, of an acquired aversion. If most of you think back you can probably remember some situation in which you ate something, became ill, and the next time you were faced with that food you just couldn't deal with it. The thing that is so amazing about this, from a psychologist's point of view, is that it is essentially one-trial learning, which is very rare. In fact, the effects usually persist for years and years. People will report, "When I was six years old I ate such-and-such and got sick afterwards. Now when I look at such-and-such, boy, it really turns my stomach." The other interesting thing about this learning is that it is not the acquisition of knowledge, per se, it is not saying to yourself, "If I eat this, I'm going to get sick," because you don't know if it will happen again. It's really the acquisition of an affective response to food.

But anyway, due to an accumulation of evidence regarding the importance of the quality and quantity of experience with food in determining preferences, I was forced to reorganize my thinking. I finally said to myself, "All right, although I'm not a social psychologist, if I'm really going to look at how food preferences and eating behaviors develop during childhood, I'm going to have to look at the social context in which eating occurs." This, as I have said,

has led to a series of studies that have investigated the social presentation context and how that influences the formation of food preferences.

The first study of this type that we did was one that was precipitated by the "Cocktail Party Study." It is, I think, an example of how data collection leads you to certain kinds of hypotheses. It was clear that kids were being influenced by their peers in the "Cocktail Party Study." So what we did in the subsequent work was to initially assess the kids' preferences for a set of vegetables. We then selected two vegetables for each child, their most and least preferred items. We then arranged seating in the lunchroom at the laboratory based on the children's preferences.

For example, we set up a table for lunch in which there would be one child, a "minority" child, who, let's say, loved carrots and hated peas, and that kid would be seated with four other kids who loved peas and hated carrots. Then we simply gave the children the two vegetables and told them they could make a choice. On the first day of a four-day sequence, we had the "minority" or target child make his or her choice first followed by the peers; that gave us a check on the preference data. On subsequent days that target child chose last, after having the opportunity to observe the choices of the peers.

In this study we looked at a number of measures to determine the effects of social influence. Included were food choices, consumption behavior, and preference before and after peer modeling. Table 1 quickly shows you the results for the choice data. On day 1 you'll

Table 1. Proportion of nonpreferred first choices on days 1 through 4 for target and peer children.[a]

	Day			
Group	1	2	3	4
Target (n = 17)	.12 (.41)	.41 (.43)	.59 (.51)	.59 (.61)
Peers (n = 48)	.15 (.19)	.20 (.24)	.16 (.22)	.15 (.14)

[a]Proportion of total choices, including all choices subsequent to first which were nonpreferred, appear in parentheses.

see that the children chose a low proportion of their nonpreferred item, which is what we hoped would happen. Notice that for the peers,

that proportion stays constant across the four-day sequence. It is down around .15. In contrast, for the target children though, the proportion increases from .12 to .59 by the end of the four-day sequence.

The question is that, if the child indicated a particular food was preferred on Day 1, was the child still choosing that preferred food on Day 4? We found that five out of 15 of the target kids hung right in there stubbornly and refused to be susceptible to our social influence procedures, but that the remaining ten were apparently influenced by the food choices of their peers and switched. By the end of the week, they were choosing their nonpreferred item over the one they had initially told us they most preferred. In contrast, their peers, as you can see, continued to select their preferred items. We were able to demonstrate that peer models had a real impact on food choice.

Our tactics since coming to the realization that experience is very important in the development of food preferences and eating behaviors have been to ask, "What experiences do children have with food? In what context are they given foods? What effect might these presentation contexts have on the development of preferences?" To get answers to these questions, we've used the survey literature and anything else we can find that suggests something about the context in which foods are presented. We then attempt to simulate these contexts in the laboratory and particularly try to simulate some of the things that caretakers do when feeding children. We then try to use careful observations and the preference and consumption data to establish what the impact of those practices might be.

One example of some useful information that has come from the survey data available appears in the work of Eppright et al (2), and Kram and Owen (3). This work indicates that 50 to 60 percent of parents of preschool children use food as rewards or pacifiers. At the same time 20 percent of these parents expressed concern that consumption of sweets was too high. If you stop and think about it, you'll agree that most of the foods used as rewards or as pacifiers tend to be highly palatable, usually sweet foods; they are used <u>because</u> they work very well to control children's behavior.

I have brought this up because I'm next going to talk about the effects of using food as rewards on food preference. I'm also going to talk about the effects of instrumental eating on food preference. I would like you to think of foods as being involved in one of two components of a behavioral contingency. First, in a contingency, a behavior is performed in order to obtain a food reward: "Pick up your toys and then you can have a cookie." Eating can also be the instrumental behavior. I think most of us can remember some of this: "Eat your cereal and then you can go outside and play. Finish your vegetables and then you can watch TV." Of course, food could be employed in both components of a contingency, such as: "Finish your peas and then you can have some chocolate cake."

There tends to be a confounding of food and function. Sweet, highly palatable foods tend to be used as rewards while foods eaten

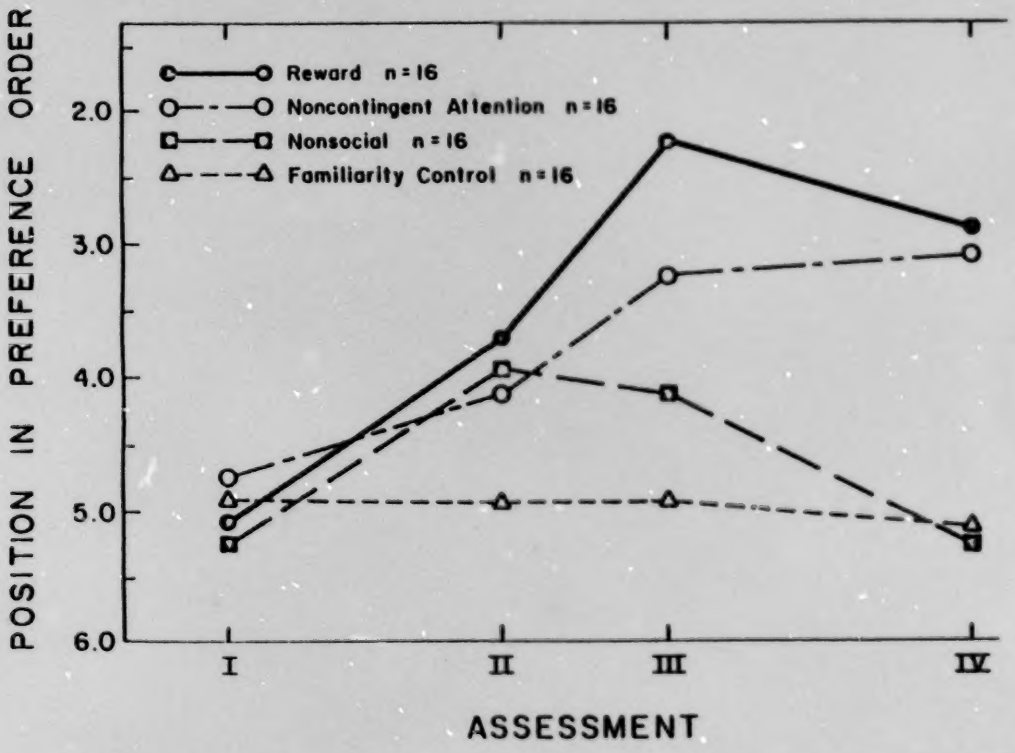
instrumentally to get a reward tend to be foods that children do not find palatable and that parents want to see consumed in greater quantities. Parents may resort to the use of instrumental eating and contingencies in the case where the child's baseline consumption of a food is very low and the parents feel that the child needs to eat more of that food.

In this study on the effects of using food as rewards we had four groups with 16 children per group. Each child was assigned to one and only one of four treatment groups or conditions. Of most importance for my discussion is the reward condition. There was also a non-contingent attention condition, a non-social condition, and a snack time familiarity control. In the reward condition we trained the preschool teachers to present each child with a food that was initially neutral for the child. This was based on assessed preference for the snack foods. The presentations were contingent on the child's doing something that was good, a pro-social behavior.

In the reward condition, for example, the child was in a free play situation and would, let's say help a friend. The teacher would run over and say, "Gee Ralph, I really like the way you helped your friend, Susan. Here, have an animal cracker." The children initially thought that was a little bizarre, but the adults at the laboratory are always doing strange things. In the non-contingent attention condition the children also received a food from the adult (the same number of presentations; there were two presentations per day over six weeks). In that non-contingent attention condition, the food was presented non-contingently during free play; the adult would approach the child and say, "Hi Ralph, how are you doing? Here, have a peanut," or whatever. In the non-social condition, the children were presented with food but not in a social context. The food was placed in the child's locker while the children were outside. The children were told, "You're going to find some food in your locker, you can eat it if you want to. If not throw it away, but don't give it to anybody else." Finally, there was a fourth group that simply got the initially neutral food at snacktime along with all the other items in the assessment set in the routine way the kids have snacks at the lab. All four groups received two presentations per day for six weeks.

We assessed preferences midway through the procedures, following the cessation of the presentation procedures and at six weeks following the cessation of the procedures. The results are presented in Figure 3 on the next page. I would like you to pay particular attention to what happened to the reward group. We got a large and significant increase in preference for the presented food in the reward group and also a significant increase for the non-contingent attention group. Basically there was no significant change in preference for the children in either the non-social or the familiarity control conditions. I would also like you to note that the procedures stopped just prior to the third assessment and we came back six weeks later after we'd stopped making presentations and assessed preferences again. As you can see, even after six weeks we still had an elevated preference for the foods presented either as rewards or in combination with positive adult attention.

Figure 3. Food preference changes under four different conditions at four assessment points: before treatment, midpoint, end, and six weeks later



More recently we have been looking at the effects of the use of foods in the other component of a contingency or in what I would call "instrumental eating." Again, there is a fair amount of information suggesting this is a relatively common parental practice. We have tried to simulate this practice in the lab although in our first attempt I don't think we did a terribly good job.

I want to describe the study to you but before I do that let me say a little bit about the "clean plate syndrome" or what the use of instrumental eating might be doing in the development of eating behavior. Several investigators have talked in terms of psychosocial factors that might be involved in the etiology of obesity, particularly in the context of the externality hypothesis. This externality hypothesis states that at least some obese people tend to be more focused on external cues than on internal ones and that is why they eat more when food is available. At any rate, I would argue that it's possible that the way some people come to rely heavily on external cues to regulate eating is that parents use procedures that emphasize external cues. In these cases the child is explicitly learning, "Don't focus on whether you're hungry or not; focus on and stop eating

when your plate is empty." This is one of the messages that could be transmitted through the use of instrumental eating procedures by parents. So it's possible that children are getting, through these procedures, very explicit information on what cues to attend to in terms of controlling their own eating behavior. Actually, a similar phenomenon holds true in using foods as rewards in the sense that the child is also learning, "Don't attend to internal cues and eat when you're hungry but eat, for example, when you do something good." Children are learning to use foods to satisfy needs other than hunger.

Let me tell you about the instrumental eating work. In the first study I was compulsively the experimentalist and so the study, although well-controlled, may not be terribly representative of what parents actually do. We have subsequently done some work that I think is a better simulation of parental practices.

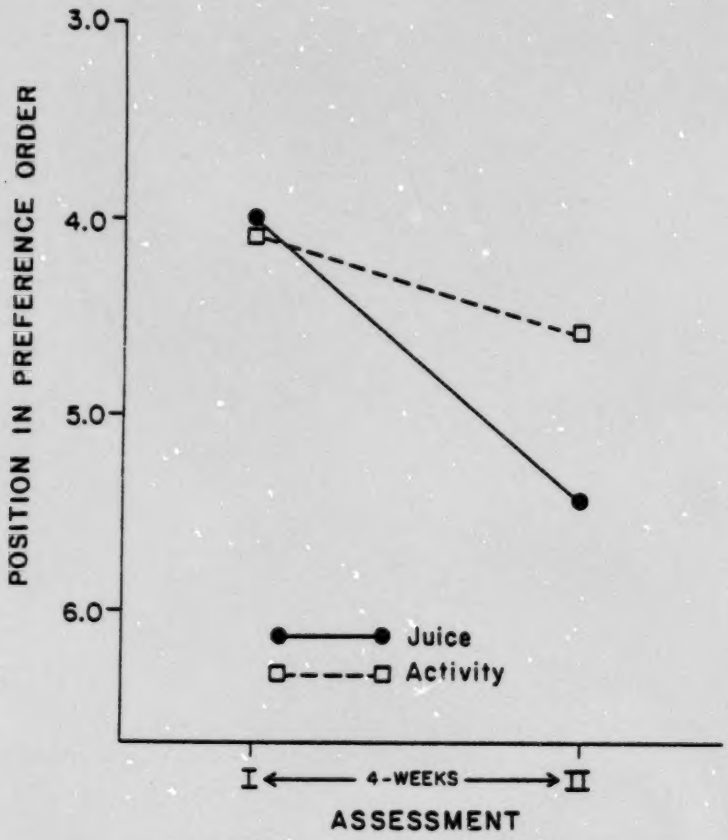
However, in the first study we began again by assessing preferences for fruit juice and selected a relatively neutral juice for each child. We then generated fixed-ratio schedules for each child and basically placed each child in a situation where the child had to drink a certain amount of fruit juice in order to gain access to a play activity. It was supposed to be analogous to the parent saying, "Finish your carrots and then you can watch TV." Children were told, for example, "Drink this juice and then you can ride the tricycle."

We arranged the fixed ratio schedule so that the children were forced to drink a bit more than their baseline amount. Again, this is vaguely analogous to what the parent is attempting to do in employing instrumental eating. They had to drink more than they had spontaneously consumed in a previous baseline session. We increased them over baseline approximately an-ounce-and-a-half so that it wasn't a lot and satiation shouldn't have been a major factor. Play activities serving as rewards included such things as puzzles, blocks, tricycles, water play and drawing. So the children were told, "Drink this juice and then you can play."

We had six contingency sessions of this type over a three-week period. We then came back and reassessed preferences following this experience. We had 12 subjects in this initial study. So, even though we have a fair amount of detailed information about each subject, the sample size is small.

In Figure 4 on the next page you can see the mean position in the preference order at the first assessment and following experience with instrumental drinking at the second assessment. There were about four weeks between the two assessments. You can see that we obtained a rather precipitous and significant decrease for juice preference but a small and non-significant decrease in preference for the activity used as a reward.

Figure 4. Change in preferences of three- and four-year-olds for juices consumed instrumentally and for contingent activities (n = 12)



As I said, I thought there were some problems procedurally with this study because it wasn't a very naturalistic procedure. What we did more recently was to replicate this work on instrumental eating using a much more naturalistic procedure. One reason for the study was to replicate the initial finding; a second reason was to try to begin to determine what was responsible for the previously observed effects of instrumental eating on preference.

The studies I have described so far have been ones in which all we have been doing is asking, "Can we demonstrate that some effects occur under certain environmental conditions?" I had not tried to move beyond that and ask, for example, "Okay, a particular effect has occurred; what kind of psychological process might be responsible for the effect?" I see this as a different level of research, a different level of theorizing about things if you will, in which one goes beyond trying to build relationships between observables in the environment and the behavior of individuals.

If you look at the psychological literature, you will find that there are at least two theories which could account for the negative shift in preference we observed in the instrumental eating setting. The first theory is the one that is referred to as response deprivation. It comes from work on instrumental behavior in animals. This view assumes that the individual has a preferred level of doing something, whether it is eating or bar pressing. If you force the organism off that baseline, the organism is going to find that aversive. So, if I tell Tony to eat chocolate eclairs and I know he likes to eat one but I make him eat six, he's going to find that aversive. At any rate, that's the general notion. It predicts that, if you were to have children eat instrumentally to obtain a reward but not force them over their baseline in instrumental eating, you shouldn't get a negative shift in preference. So it's somehow not the instrumental part per se that is important; it is the forcing of a person over his or her baseline. Obviously what we did in the study was to generate two conditions which were the same except that in one we forced the children over baseline and in the other we just had the children eat the baseline amount in order to obtain a reward.

The alternate view comes from attribution theory and the work of Mark Lepper (4) and his colleagues at Stanford on overjustification, work that has been referred to as illuminating the "hidden costs of rewards." Lepper's work has been done with children and has usually employed play activities. He has been able to show numerous times that, if you take an activity that children <u>like</u> to do and begin to reward them for doing that activity, you get a negative shift in preference and a decrease in the time spent engaging in that activity. Within the attribution theory/overjustification view the interpretation of what is responsible for the negative shift is roughly as follows: The child is saying, "Gee, if she has to give me a reward for drinking this stuff, I must not like it very much." This is a very cognitive type of interpretation of what's going on. Frankly I have my own questions about whether it's an appropriate interpretation of what is going on in the head of a three-year-old. At any rate, the theory goes on to say that if you use tangible rewards you get negative shifts but if you give verbal praise for what the person is doing you should not get negative shifts. This suggests two kinds of instrumental conditions. In one you give the child a tangible reward; in the other you give him verbal praise for drinking.

These two theories led to the design of another study and a set of predictions that we tested. By crossing the two conditions of this variable with two levels of amount consumed, one at baseline and one over it, there are four conditions that can be studied.

Again, we initially assessed preferences for, in this case, a set of dairy products. We used kefir which is like drinkable fruit-flavored yogurt. In the first of four conditions the child at regular snacktime was to drink the preferred baseline amount--whatever the child wanted -- and receive verbal praise for drinking, "Oh, that's really good to drink that." The second condition was one in which the child had to drink more than the baseline amount combined with verbal praise. Once it was clear that the child had finished,

the teacher poured more kefir. After the child drank some of that the teacher said, "That's really good, you drank more." The third condition was a baseline tangible reward condition. This was really a lot of fun. The child was to drink a baseline amount and was told, "Drink it and I'll give you a ticket to the movies." We had a series of 10-minute kids' movies that followed right after snacktime. Finally, in the fourth condition the child had to drink more, and by doing so also received a movie ticket. We repeated this routine once a week for eight weeks.

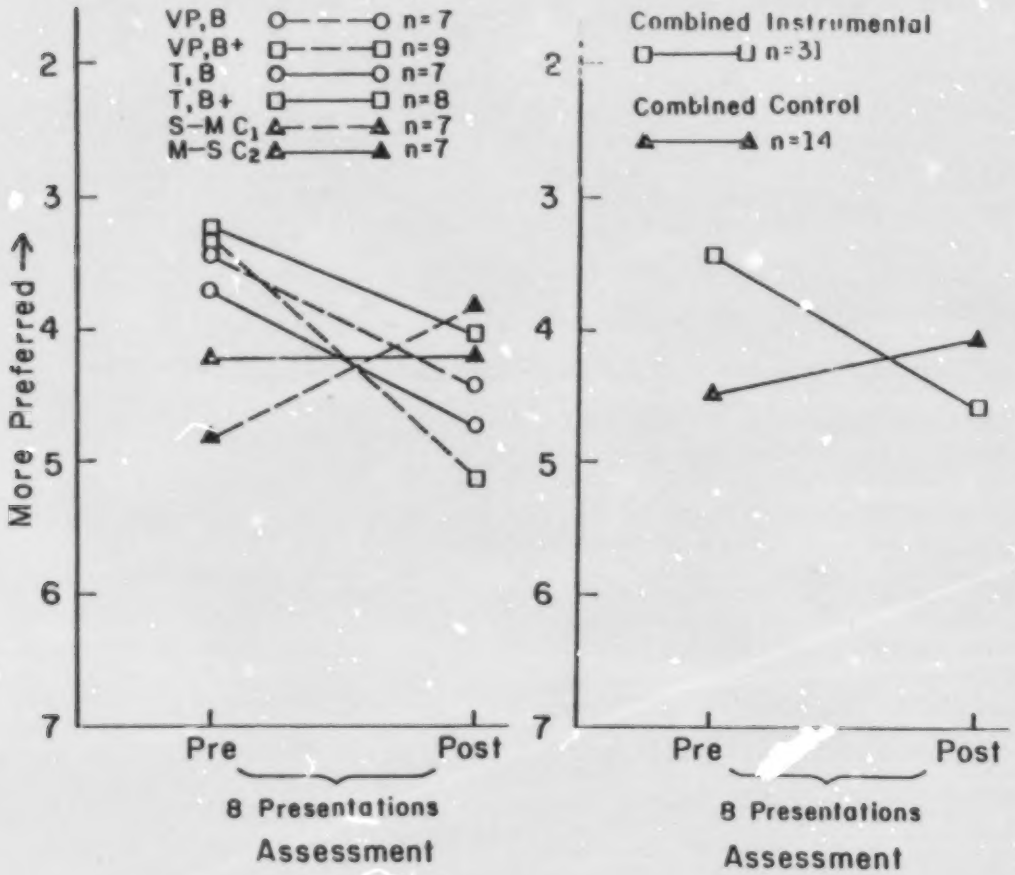
We were careful not to be aversive, to use any sort of threat of punishment contingent on not drinking. We focused very strongly on the positive presentation of the rewards being contingent on drinking. I want to emphasize this because I think that parents often use threat of punishment as well as the possibility of the receipt of positive rewards. For ethical reasons we didn't push these contingencies very hard. The kids were asked to drink more and were given a ticket to the movie. The movie was so powerful as a reward that we didn't have any trouble getting the kids to drink more in order to obtain movie tickets. I should say we also had two additional control conditions in the study; children assigned to these conditions received the same package as the experimental groups but without the contingencies. They all had kefir for snack and saw a movie but without a contingency being presented.

We obtained a negative shift on preference for all four instrumental conditions, as you can see in Figure 5, shown on the next page. The overall decrease in preference is significant. However, there were no significant differences among the four instrumental conditions. This is a bit depressing to me since it is my one great foray into testing hypotheses about psychological processes based on psychological theories. In general we were able to replicate the basic effect but are no further along in understanding what processes might be responsible for the effects.

On the right side of Figure 5 you can see the results for the combined instrumental conditions as compared to the two combined control conditions so that you can see that, in contrast to the negative shift obtained for the instrumental eating conditions, a slight positive shift was noted for the familiarization control groups. The reason I think we got this positive shift is because kefir was unfamiliar to the children when we began the study. These familiarity effects are one of the clearest things that we see throughout our data.

We also have data showing consumption for the instrumental and control groups before, during and after all the contingency sessions. We found, not too surprisingly in the case of instrumental eating, that our contingencies increased consumption dramatically. Following the contigency ressions consumption drops way down, in fact, to a level slightly below where it was initially.

Figure 5. Change in preferences for a beverage consumed under four different treatments: baseline amount leading to verbal praise, baseline plus leading to verbal praise, baseline leading to movie ticket, baseline plus leading to movie ticket; and two controls: beverage and then movie, movie and then beverage (left half). Change in preferences when the data from the four treatments and the two controls are combined (right half).



Although this finding is tentative, it may have some implications for behavior modification. For example, if parents use contingencies, or instrumental eating, to get children to eat vegetables at home, then in a situation where there is no contingency present, such as school lunch, it may be likely that the child will not consume any or many vegetables. At any rate, instrumental eating can be used to very effectively increase immediate consumption--I don't think there is any doubt about that--but the question is whether there are long-term

undesirable effects of such procedures. If you believe, as I do, that food preferences and eating behaviors that are found in early childhood are reflected in eating patterns later on, I think we need to make parents aware of the potential negative effects of these practices.

This leads me to my conclusion. Food preferences and eating behaviors appear to be largely learned. This learning is going on in the young child continuously in the presence or absence of explicit nutrition education. Because it is a lot easier to get people to eat things that are good for them if they like those things, perhaps part of nutrition education and parent education ought to involve instructional situations and encouragement of home experiences that will maximize the chances children will like the things we think they ought to eat.

Question-and-Answer-Session

Question:

What problems have you had with response rate of three-year-olds in terms of getting them to participate in the experiments and to try things?

L. Birch:

We find that we have very little trouble. However, this may not generalize to other preschool settings. We get the kids typically as two-year-olds or as three-year-olds and they typically stay at least two years. If they come as two-year-olds they may be with us for three years. The kids routinely have snacks and lunch. One of the rules--we don't have many--is: "You shall try whatever is placed in front you." The kids adjust to that very fast. They don't have to do anything but taste. That was the procedure before I came on the scene. Once in a while you get a child who simply won't cooperate. It is impossible to get information from a child who doesn't want to give it to you and senseless to make the child unhappy. But probably 95 percent of our kids are cooperative. The other thing is that those kids are typically middle class, reasonably bright, verbal kids. I am sure I wouldn't get the same kind of cooperation from children if I went to another facility. One question about the research is: "To what population can we generalize? "Does this possibly different attitude toward cooperation and response mean that the results of the research are not generalizable to other populations?" We don't know for sure.

Question:

It's very exciting stuff. It really is. I'm curious about the speculations that you might have about adult behavior and the relationship to obesity. It would seem that you were implying something about parental behavior instilling responses to cues surrounding eating and food preferences that may have something to do with obesity for some people in adult life.

L. Birch:

The food-as-a-reward situation is that you have to do something instrumentally, clean up your room or whatever, in order to get that reward. The foods eaten instrumentally are things that tend to be unpalatable and that kids don't want to eat, like vegetables. What gets us in trouble in terms of obesity are highly palatable things that we like a lot, many of which happen to be sweet. You are right, it is clearly not as simple as I'm making it sound. I think those two things operate and they operate differently, but both operate in a way that gives kids a lot of cues about what eating means and when you are supposed to do it and why. A couple of years ago we set up a study where we picked obese kids and normal-weight kids and their mothers and looked at interaction patterns. It was a classic deception study in which we brought them into the lab and had the kids eat lunch with their mothers. We videotaped the whole smash and coded the interaction patterns. We found differences in our two groups in terms of interaction patterns, which I think is pretty interesting. I wish somebody would get interested in the area and do more work there.

Question:

May I explore what might be a third kind of eating, and that is when a food is its own reward? One discussion I've heard is that one can educate kids about proper nutrition by example and by structuring the food consumption settings so children will eat the things they ought to eat simply for the sake of being properly nourished. Presumably that kind of food consumption becomes rewarding in itself. This assumes that somehow mothers or the school nutritionist could design meals in such a way that the foods are rewarding in themselves. I don't know if this is realistic or not. And this approach gets so tied up with skill in food preparation, too.

L. Birch:

I believe we need more research to study what sounds to me like an interesting hypothesis. I hear a common story from my college students and some of the rest of you must, too. They will tell you things like, "Oh, I studied for this exam for three hours and then I went out and got a pizza because I told myself, if I studied all this stuff, then I deserved a pizza." So, as you get older you begin to use foods as self-reward. It may be that one is responding to cues other than hunger that were learned in early childhood. One begins to supply one's own reward once one is old enough to have access to foods and that reward may or may not have anything to do with need for nutrients.

Question:

When you were looking at the effect of familiarity on food-preference behavior, did you see any familiarity effects on quantities consumed? In other words, have you observed any effect the preferred amount of food modelled by the peer group had on the target child? Does the consumption increase or decrease, based on the quantity or the norm of the group one is eating with?

L. Birch:

That's a really interesting question! I haven't observed that. Maybe I ought to. It's a good idea, and really is concerned with the effectiveness of modelling in possibly changing food consumption patterns, especially in changing what we might view as poor, over-consumption ones.

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CASE STUDY II DISCUSSANT

USEFULNESS OF PSYCHOLOGICAL TRADITIONS FOR THEORY-BUILDING

Isobel Contento

The series of studies described by Birch on the effects of familiarity, presentation context, social modelling and the effects of extrinsic rewards on the formation and modification of food preference in preschool children provide an excellent case study of one approach to theory building. Her studies are based on a behavioral framework and an experimental methodology. My own research on elementary school-age children has been based, in contrast, on a Piagetian framework and has used a semi-clinical interview methodology. As I reflected on her approach and mine, it became clear that our two approaches, being derived from different frameworks in psychology, carried with them different assumptions about the determinants of nutritional behavior, different research methodologies and different implications for how nutrition education should be conducted.

I will use the categorization scheme developed in my earlier presentation at this conference (see Contento: Toward a Framework for Theory Building in Nutrition Education Research, p.--) as the framework in which to discuss and compare the work of Birch and myself. Birch began her research program from the perspective of a psychologist interested in the determinants of eating behavior. Her work with preschool children is based on a behaviorist framework. Her first studies show that food preference--an affective component of eating behavior, with the underlying salient dimensions of sweetness and familiarity - is a primary determinant of consumption. The behaviorist perspective, therefore, appears to be an appropriate one.

Birch's methodology is an experimental one. Thus, her studies have been conducted with small groups of children in a laboratory school setting where the variables can be carefully controlled. The strength of this approach is the precision with which variables can be manipulated and studied and the data can be analyzed statistically. Its weakness is its potential lack of generalizability to larger groups in natural settings.

Behaviorist theory has suggested to her the variables she should investigate. Thus, she used a classic conditioning paradigm to study the effects of social-affective context on the modification of food preference. She also used the notion of modelling from social-learning theory to study the effects of peer models' food choices and eating behavior on these preschoolers' preferences. The goal of these and other studies she described is to develop a theory of the formation and modification of food preference. Thus, the Birch research provides one example of theory-building in nutrition education research.

The implication of her research for nutrition education, as would be predicted from the categorization and discussion in my earlier presentation (see Table 1, p. 4) is, in fact, stated by her (1): that various behavior-shaping strategies should be used in work with young children to minimize the preference for foods lower in nutritional value and to maximize the preference for foods higher in nutritional value.

The perspective with which I embarked on my research, on the other hand, was that of a nutrition educator concerned that the formal nutrition education provided in schools should serve as an enabling factor in children's ability and motivation to choose healthful diets. Not surprisingly, therefore, I chose a more cognitive psychological framework. The usefulness of a Piagetian framework for nutrition education with young adults (2) led me to choose it for my work with elementary school-age children.

The children were individually interviewed in a naturalistic setting to assess cognitive development level. The strengths and weaknesses of this approach are the exact opposites of those of a behaviorist approach. The strength is that findings obtained in a naturalistic setting are likely to be generalizable to other real-world settings. Its weaknesses are that variables are not well controlled and data do not lend themselves to complex statistical analysis.

In a first study (3), the purpose of the interviews was to probe children's thinking about food and the eating process. Pre-operational children (generally the five-to-six-year-olds) were found to consider all edible items as "food." They viewed food as staying in the stomach or tissues unchanged, or as passing through the body unchanged. The concrete-operational children, on the other hand, consistently distinguished between "food" and "snacks" and viewed food as undergoing some changes into smaller particles with a different form (e.g., mush) when inside the body. Only a few of the late concrete-operational children (generally nine-to-eleven-year-olds) demonstrated an understanding that food brought about its effects on the body through components of food called "nutrients." That is probably because younger children cannot carry out hierarchical classification, that is, understand that "sugars" or "vitamins" are at the same time also "foods."

These findings suggest that, among other things, children at these ages might have difficulty placing foods into the Basic Four Food Group system since it is essentially a nutrient-based system which places items such as beans and meat or oranges and potato chips into the same groups on the basis of their nutrient content. The next step therefore seemed clear: we needed to find out how children <u>did indeed</u> spontaneously classify foods when they were not given specific instruction on any system such as the Basic Four.

Accordingly, a second study was conducted with the same age group. One hundred and fifteen children were again individually interviewed, this time in a school setting but outside the classroom. They were given pictures of about 70 foods and asked to place them in groups that were alike in some way or that they thought should go together. A cluster analysis was then performed on the children's responses. The results of this analysis are presented in Table 1 (next page), where the numbers represent medians on a similarity index scale of 0-100. This matrix of similarities was obtained from a cluster analysis of variables. Clustering was by maximum distance. The measure of similarity was the absolute value of the correlation.

From Table 1 you can see that for the subjects as a group the foods fell into eight clusters: fruits, vegetables, meat, mixed foods, sweet foods, breads and breakfast foods, cheese and yogurt, and drinks. Some of these clusters have quite high within-group similarity--fruits, vegetables, meat, sweets and desserts, and breads and breakfast foods. Others had lower within-group similarity--mixed foods, cheese and yogurt, and drinks. These eight groups were clustered into four larger food groups--but they were not the Basic Four.

Other data of interest to nutrition educators are that 100% of the children formed a sweets group, 70% a meat group, 57% a fruit group, 50% a vegetable group (only 25% formed a combined fruit and vegetable group), 24% a dairy group and 20% a breads-and-grain group. Beans were never placed in the meat group and potato chips never in the vegetable group. Milk was classified with drinks by 54% of the sample, and ice cream with sweets by 70%.

The implications of these studies are that nutrition education should take into account the limitations in children's understandings of such concepts as nutrients, should deal explicitly with snacks and other sweet items so prominent in children's thinking about food, and should experiment with food grouping systems that are less nutrient-based and more consonant with children's spontaneous classification systems. These implications seem to be totally unrelated to those derived from Birch's work. However, when cluster analysis was repeated for the responses of children at each of three cognitive development levels -- pre-operational, early concrete-operational, and late concrete-operational -- the food groupings were found to differ among children at each of these levels. These data are shown in Table 2.

Pre-operational children in this sample placed foods into ten small groups and two large groups. The concrete-operational children placed foods into slightly fewer small groups and four large groups; but again, not the Basic Four. Preliminary results from a multi-dimensional scaling (MDS) analysis seem to indicate that sweetness is the most important dimension for classifying foods among the pre-operational children, again generally five-to-six-year-olds. Indeed, the two larger groups formed by these children appear to be a "sweet food item" group and a "non-sweet food item" group. These children are thus similar to Birch's three-to-four-year-olds in the importance they attach to sweetness.

Table 1. Children's spontaneous food classification groups obtained from cluster analysis resulting in medians on a similarity index scale of 0 to 100, expressed as the percent of times any two foods were placed in the same group by respondents.

	Within subgroup	Within group	Fruits	Vegetables	Meat, fish	Mixed foods	Rice and noodles	Candy and desserts	Breads	Breakfast cereals	Waffles and eggs	Cheese and yogurt	Drinks
Fruits	90			29	5	9	5	8	6	5	8	10	8
Vegetables	78	46											
Potatoes	81		29		14	17	20	2	7	5	9	12	5
Beans	67												
Meat	85		5	14		33	16	1	8	3	4	11	6
Fish	79												
Mixed foods, sandwiches	48	36	9	17	33		32	3	14	8	13	11	8
Rice & noodles	45.5		5	20	16	32		4	18	17	13	11	4
Cakes & desserts	67.5												
Candy, ice cream, snacks	65	57	8	2	1	3	4		10	9	9	10	10
Breads	64		6	7	8	14	18	10		35	24	16	9
Breakfast cereals	88.5		5	5	6	8	17	9	35		44	16	13
Waffles & eggs	43		8	9	4	13	13	9	24	44		14	13
Cheese & yogurt	21 43		10	12	11	11	11	10	16	16	14		21
Milk, O.J., soda	52		8	5	6	8	4	10	9	13	13	21	

Table 2. Children's spontaneous food grouping systems as obtained from cluster analysis for children at three cognitive developmental levels.

Preoperational			Early concrete-operational			Late concrete-operational		
	Median[1]	Cluster pattern		Median	Cluster pattern		Median	Cluster pattern
Fruits	70		Fruit	81		Fruit	87	
Sweets/ desserts	56		Vege-tables	46		Cheese/ yogurt	39	
Drinks	61		Meat	77		Break-fast foods	66	
			Mixed foods	32				
Vege-tables	61					Vege-tables	55	
Beans	61		Sweets/ desserts	41				
Meat	70					Meat/ mixed foods	32	
Mixed foods	51		Breads	64				
Potatoes	47		Break-fast foods	63		Drinks	49	
Cheese/ grains	37		Cheese	41				
			Drinks	61		Sweets/ snacks	54	
Break-fast foods	47							

[1] Medians on a similarity index, scale of 0 to 100, presented here as within-group calcuations.

Although sweet foods persist as a separate group for both early and late concrete-operational children as shown in Table 2, other dimensions of foods emerge from the MDS as being of greater importance. These were dimensions such as whether the items are snack or meal items (confirming the findings of the first study), and whether they are processed or not. These results suggest that while sweet taste, an affective factor, is an important dimension for classifying foods, cognitive factors also appear to become important with increasing developmental level.

Indeed, Birch (4) found that, for preschool children who used standard semantic categories for sorting foods, preferences could be enhanced for the presented foods but also could be generalized to other foods perceived as similar to the presented food. She notes that "children's preferences for foods are directly related to their cognitions about these foods (p. 757)" and suggests that "the shift from a specific to a generalized enhancement of preference is age-related and is mediated by cognitive development (p. 758)."

Work derived from two different theoretical frameworks therefore begins to merge. The results from these two different sets of studies can be combined to suggest that preference is an important determinant of eating behavior in young children but that other food choice criteria may also become important with increasing developmental level.

This possibility would not be surprising. Levanthal (5) has noted in another area of health behavior that a young child, who at age six or eight cannot stand the taste of cigarettes and chides his parents for smoking, is often himself smoking at age 12. Obviously other factors have overcome whatever affective response he had to cigarettes when he was younger.

It should be noted that we are talking here about group data. There are, of course, individual differences. For example, for some individual, preference may remain the primary determinant of food choice throughout life. Individual experiences leading to specific food aversions which persist throughout life also occur (6).

One potential theoretical base for testing the notion of individualized criteria is suggested by a decision-making model such as the Subjectively Expected Utility (SEU) model I mentioned in my first presentation (p.--). Using this approach, which does not specify a priori which variables to examine, we can identify the criteria used by children to choose among foods (e.g., taste, preference, beliefs about the health consequence of eating it, whether peers eat it, etc.) to estimate the relative importance of each of these criteria and study the influence of the social-environment context.

Adding a process-tracing approach (7), we can also study the decision-making process children engage in when making food choices. The methodology would involve the standard social-psychological technique of the survey conducted, however, in an individual-interview format. The outcome measure would be children's food consumption. The data would then be analyzed statistically.

Such an approach would permit the incorporation of the results derived from both Birch's and my studies. That is, preference would be included as one of the food-choice criteria and the cognitive development level of the subjects would be assessed. In that way we would be able to study the relative importance of cognitive and affective dimensions in food choice as well as the nature and complexity of the food-choice process at different cognitive development levels. Currently, we are planning just such a study.

If results of further studies indicate the food decision-making process is dominated by preference criteria among preschoolers but includes more varied and abstract criteria with increasing development level, then nutrition education strategies to shape desirable eating behavior should be used predominantly in the early school years. As children attain higher levels of cognitive development, nutrition education activities designed to increase decision-making competencies should be implemented. The two sets of implications derived from the two different kinds of studies conducted by Birch and myself, which seemed so unrelated earlier, can in this manner be reconciled.

These case-studies thus illustrate the usefulness of familiarity with the underlying assumptions and implications of the various psychological traditions for identifying a theory that is appropriate for the task at hand, for selecting an appropriate research methodology, for understanding and reconciling research from different traditions and for suggesting strategies or compatible combinations of strategies that will expand the research paradigms. What is now needed is more nutrition education research that self-consciously and systematically sets out to test promising psychological and educational theories. Such, I believe, must be the strategy for theory-building in nutrition education research. For it is out of such systematic and self-conscious research that new models which combine features of existing behavioral science models with features unique to food and nutrition behaviors will emerge.

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CASE STUDY II DISCUSSANT

SOCIAL SCIENCE METHODOLOGIES FOR
STUDYING PARENTS' PERCEPTIONS OF CHILDREN'S FOOD ACTIVITIES

Audrey Maretzki

I would like to thank both the United States Department of Agriculture and National Dairy Council for providing me the opportunity to come here today. It is standard operating procedure when you are looking at a conference budget to realize that you can have two mainland nutrition educators for the price of one Hawaiian. When supply-side economics comes in, those of us from Hawaii usually don't get invited. So it's a delight to be able to be here.

It is also a delight to be able to comment on the work that Dr. Birch has been doing. Those of us who are interested in children's food behavior and the development of food attitudes and preferences in young children watch for Leann's work in the journals. She has been doing some very interesting experiments. It was exciting to have a packet of her references arrive and to be able to review them at leisure for this workshop.

The work Leann has carried out represents a very significant direction in nutrition education research. Nutritionists often look at the food intake of children and ask whether or not they are eating "the ri„ht thing," or whether they make "better" choices after having been exposed to nutrition education. On the other hand, people in the field of child development routinely study children's behaviors. Through their work we, in nutrition education, can learn a great deal about how children develop their food attitudes and behaviors. Typically these two research pathways have not intersected, but Leann's interdisciplinary work has brought them together. I happen to believe that research at the interface of these areas offers extraordinary promise to those who want to understand food behavior and its development.

Another thing I find interesting is that Leann was not approaching her work from the point of view of immediate application. That is, she wasn't trying to improve children's diets. I was struck by the fact that her findings could as well be used to make poor eaters as to make good eaters out of children. It is important to have settings in which to experimentally manipulate the many variables affecting children's food choices, especially since settings in which nutrition education is routinely carried out do not generally offer this research opportunity. The ability to simulate, in a laboratory setting, the kinds of variables that happen in children's lives is developed to a very high degree in Leann's work.

Dr. Isobel Contento commented that she would like to know more about how age and a variety of personal characteristics influence children's food preferences. Being from Hawaii, I'm personally

interested in culture as a mediating variable in the development of food preferences and the establishment of food-related behaviors.

Isobel's recent work has drawn heavily on Piagetian theory. Recently I've become intrigued by the work of one of Piaget's students, Reuben Feuerstein, whose research on intelligence has been conducted primarily in Israel (1). Feuerstein suggests that "slow" adolescent or adult learners are retarded performers for whom the intellectual mediation essential to learning has not taken place. He has identified a variety of things that "retarded performers," as he calls them, are generally unable to do. Feuerstein finds that retarded performers are impulsive, fail to recognize problems inherent in a situation, have an episodic grasp of reality rather than seeing a totality, are unable to make comparisons and have an inadequate spatial orientation.

To overcome these handicaps to learning, Feuerstein has developed an instrument called the Learning Potential Assessment Device to evaluate retarded performers and a series of 21 instruments for teaching retarded performers how to improve their learning potential. This instructional program, called Instrumental Enrichment, is content-free but teachers are trained to bridge these techniques into content areas of the curriculum. A research effort based on Feuerstein's work might well be undertaken to determine what cognitive processes are the most salient to nutrition education. This information could then be utilized in the design of instructional programs in the same way Piagetian tasks have been designed for use in classroom settings (2).

About ten years ago I began collaborating with the Follow Through Program in Hawaii. Follow Through is a national research and demonstration program where various models of early childhood education are implemented and evaluated. I first became involved with the Follow Through schools in Hawaii because of a concern that, on any given day, approximately one-third of the K-3 children were coming to school without breakfast. And the schools did not have a breakfast program. Responding to a local need, I developed a breakfast program which had the objectives of feeding hungry children and teaching them to prepare their own breakfasts. We also involved parents in the project, training them to undertake classroom food activities with children and to plan and teach classroom lessons on food that would reinforce the nutrition message of the breakfast program. My undergraduate students in community nutrition were also involved, receiving firsthand nutrition education experience in working with low-income children as well as their parents and teachers.

Parents in the Follow Through schools would readily tell us they believed it very important for their children to learn about nutrition and what foods to eat. But, when these same parents talked among themselves, they said that what pleased them about our nutrition program was that their children were learning to care for themselves and to perform a variety of useful tasks that made life easier for the parents. This interesting dichotomy intrigued us.

Out of this setting a research project was developed to look at children's food activities from the parents' perspective. We set out to

develop a way to measure potential attitudes towards food-related tasks. "How," we asked, "do parents of children from non-Follow Through schools rate children's food-related activities?" We knew from observations that young, low-income children in the Follow Through schools were actually engaging in such activities at home. We used this list in the study. Such information, we felt, could help us design classroom food activities that would not only teach nutrition concepts but also be perceived by parents as useful and important for their children.

We produced four different sets of photographs that became our test instrument. A set of photographs showed either a first- or third-grade girl or boy engaged in 17 different food-related activities. The task of the 144 parent respondents was to view each photograph paired one at a time with every other photograph, a total of 136 pairs. For each pair the respondent was asked to select the one considered to be the more important activity for her or his own child.

These data were analyzed to determine the rank order of importance of the activities and the dimensions of importance upon which parents seemed to rate the activities. We also compared various groups of parents on the way they viewed the importance of the activities.

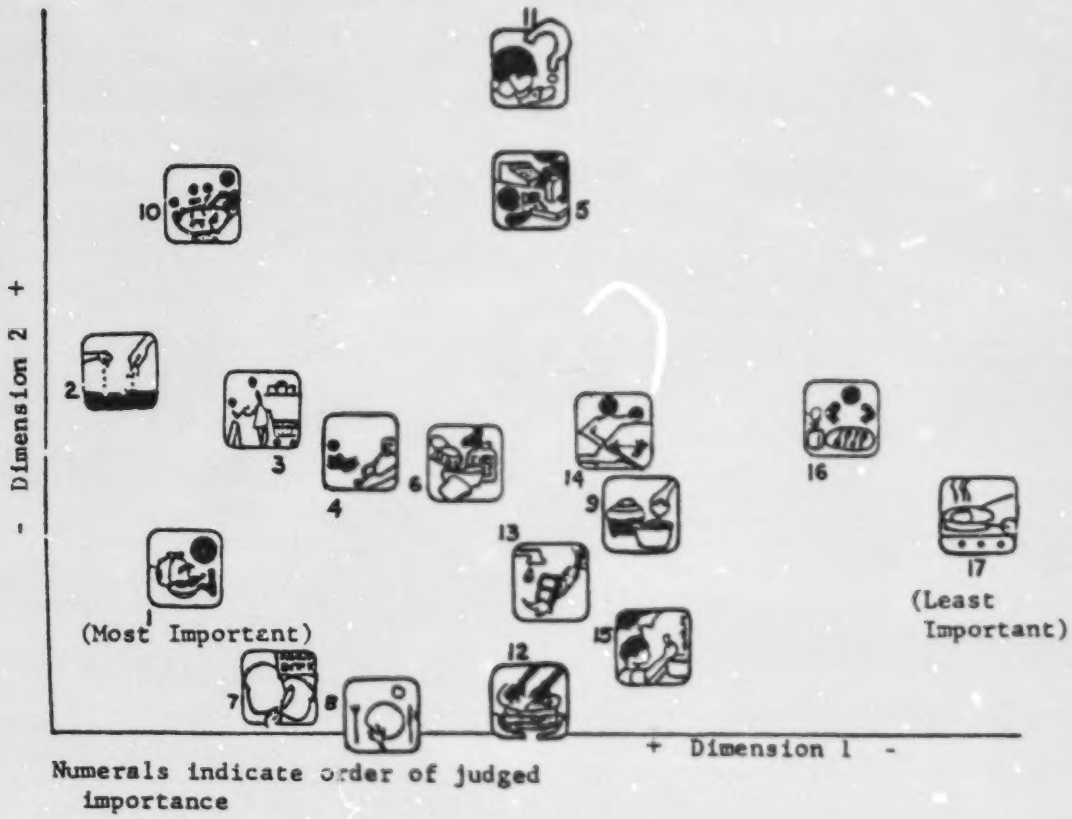
Table 1 shows the 17 activities judged by the parents. These are arranged in order of importance from the most important, "Preparing a simple breakfast," to the least important, "Frying an egg and luncheon meat."

Table 1. The order of importance of 17 food activities as judged by parents.

	Activity
1.	Preparing a simple breakfast
2.	Helping in the garden
3.	Shopping with mother
4.	Helping mother bake
5.	Going shopping for mother
6.	Making tuna-sandwich filling
7.	Making a peanut-butter sandwich
8.	Setting the table
9.	Preparing rice
10.	Going crabbing and fishing
11.	Spending money alone
12.	Washing dishes
13.	Washing and peeling vegetables
14.	Cutting vegetables
15.	Stirring food in a pot
16.	Making a simple main dish for dinner
17.	Frying an egg and luncheon meat

We next submitted these data to multi-dimensional scaling analysis, Smallest Space Analysis I (3). Figure 1 shows a multidimensional map of the relative spatial locations of the 17 activities. This provides a kind of natural map being generated in the parents' minds during the ranking process.

Figure 1. Spatial locations of the importance of 17 food-related activities to 144 parents using Smallest Space Analysis I.



Through further independent analysis (4), we were able to label the dimensions or criteria parents appeared to be using in making their selections. We determined that the horizontal dimension shown in Figure 2 on the next page can be labelled "safety/danger" or "love/-hostility." The vertical dimension can be labelled "automony/control." This suggests that parents judge food activities in accordance with a conceptual model for maternal behavior proposed by Schaefer (5).

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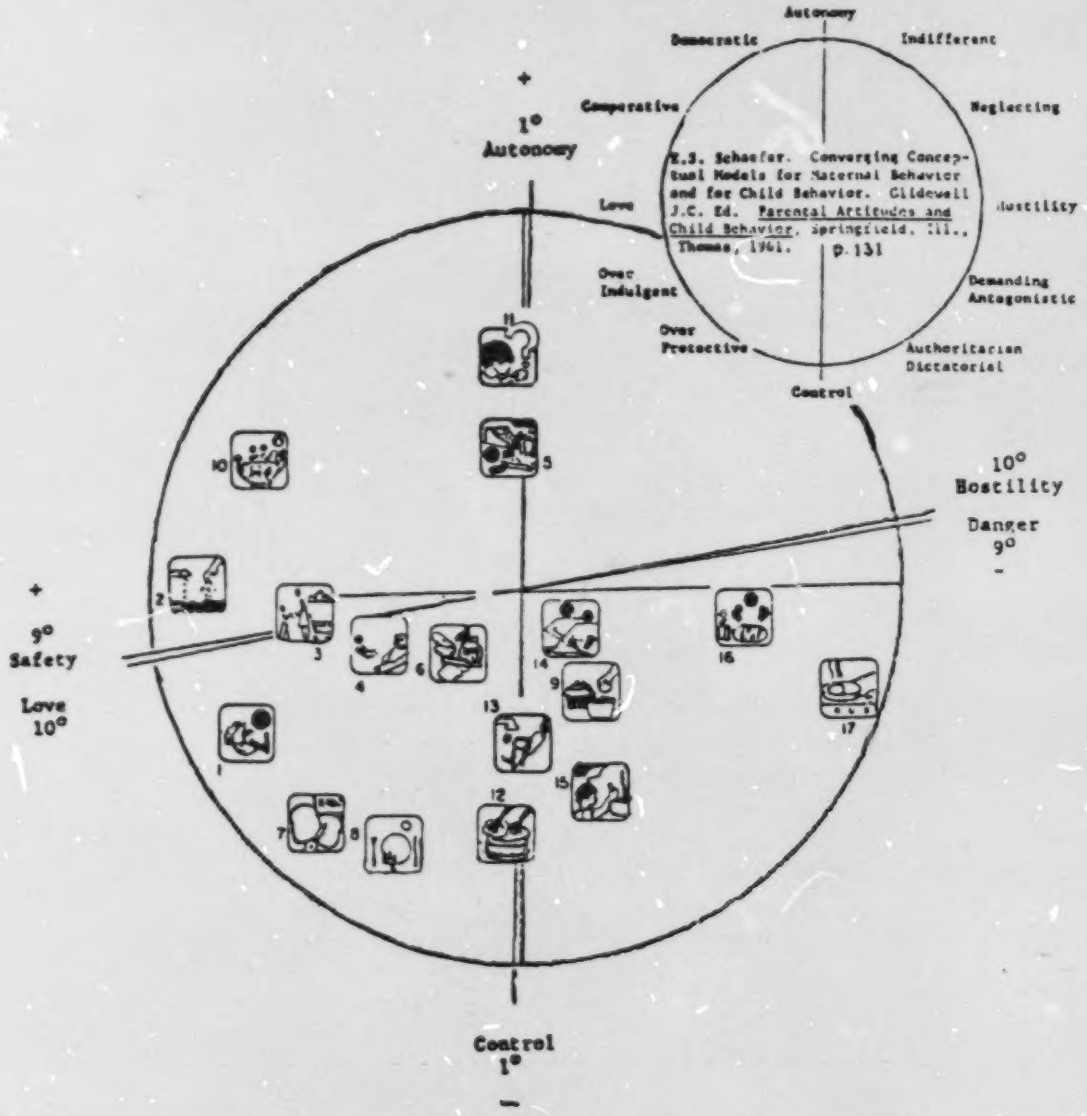
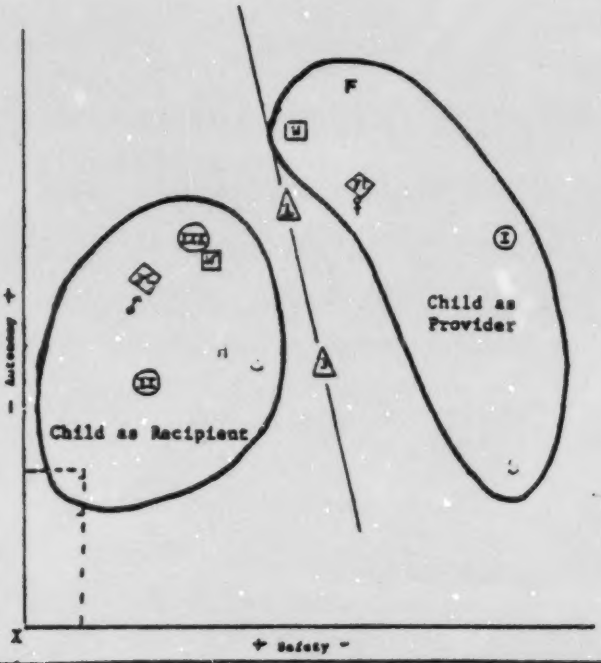
Figure 2. Identification of the dimensions of importance in parents' judgments of 17 food-related activities using non-metric PROFIT analysis.



Ultimately we performed an addition analysis using a method for working with individual differences, called INDSCAL (6). Somewhat to our surprise, INDSCAL divided groups of parents into those who were more likely to see their children as recipients of parental care related to

food and those who saw their children as providing food-related services to the family. From Figure 3 you can see that in the "child as recipient" group were parents of boys, parents whose children were not

Figure 3. INDSCAL locations for 16 groups of parents based on their judgments of the importance of 17 food activities for their children.



LEGEND	
Ethnicity F Filipino H Part Hawaiian C Caucasian S Samoan J Japanese	**School Attended** I Low Income II High Income III Middle Income
Sex ♂ Males ♀ Females	**Employment Status of Mother** W Employed Mother W Unemployed Mother
Grade 1 First Grade 3 Third Grade	**Receipt of School Lunch by Child** FF Recipient FP Non-recipient

receiving a free lunch, Japanese, Hawaiian and Caucasian parents, parents whose children attended the high- and middle-income schools and mothers who were not employed. In the "child as provider" group were

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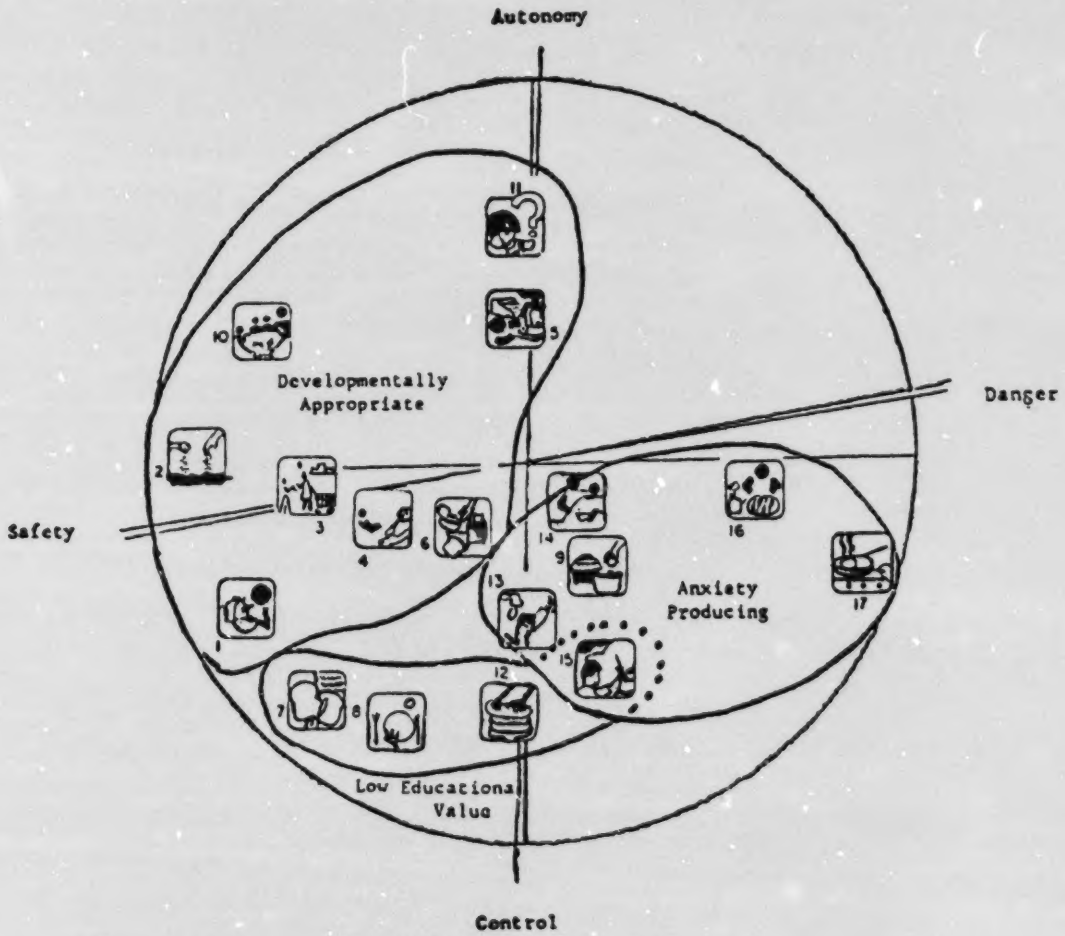
parents of girls, those whose children were receiving a free school lunch, Filipino and Samoan parents, parents of children attending the low-income school and mothers who were employed.

I mention this study because, as can be seen in Figure 4, it helps describe in quantifiable terms how parents individually and collectively

Figure 4. Location of anxiety-producing, low educational value and developmentally appropriate food-related activities using Smallest Space Analysis I.



structure children's food-learning environments based on the way they react to the idea of their child's undertaking certain food-related tasks. The nutrition curriculum implications of this basic research give me reason to be stimulated by this application of multidimensional

scaling methodologies to nutrition education (7). As with Leann Birch's work, I feel this research shows that nutrition education research can utilize appropriate social science methodologies and build upon theories from the behavioral sciences in order to establish the theoretical base that is essential to the effectiveness of nutrition education.

I believe that this conference, like those of National Dairy Council in 1978, at the Fogarty Center in Bethesda in 1979 and at Cornell and Penn State in 1980, can help pave the way for nutrition education to come of age in the 1980s, just as the science of nutrition did in the 1950s. I trust that during our sessions we will frequently be reminded that, as a discipline, nutrition education is still very young and very green. But we should not forget that it's when we're green that we're growing! It's good to see nutrition education grow with the contributions of researchers like Leann Birch and Isobel Contento.

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CASE STUDY III

PLANNING AND EVALUATING TELEVISION MATERIALS ON NUTRITION

James Swinehart

"Feeling Good" was a purposive television series of nutrition programs. I thought it was history by now, but it's worth looking into the past sometimes. What I would like to do this morning is to go quickly through some materials I've placed in front of you, give an overview of the things we could talk about, show a few videotape segments that were used in the series and then discuss any items in more detail as you would like. We can specifically discuss factors considered in selecting topics, content and formats for the programs; a summary of content, treatments and results with regard to four nutrition topics; a description of the formative and summative research conducted for the series; some examples of formative research findings; several conclusions derived from experience with the series; and several theoretical and practical issues regarding future uses of television for nutrition education.

First, let me ask you to quickly read through the abstract so you have a general impression of the "Feeling Good" project.

Abstract

The experimental "Feeling Good" television series, comprising 24 programs on a variety of health topics, was broadcast weekly during the 1974-75 season on the 250 stations of the Public Broadcasting Service (PBS). The general objective of the series was to motivate viewers to take steps which could enhance their own health and that of their families. Viewership and impact of the series were assessed through panel studies conducted by Response Analysis (N=4,000) and the National Opinion Research Center (N=400+), four national surveys by Gallup (N=1,500 each), and weekly audience measurements by Nielsen (N=1,200).

Each program was viewed by about one million adults, a figure which ranked the series in the top third of prime-time broadcasts on PBS. Of 33 behavioral goals assessed with one or more measures, strong evidence of impact was found for 10, partial evidence for 14, and no evidence for nine. Although a majority of measures assessing knowledge or opinion effects did not show gains from viewing, some evidence of such effects was found with respect to several topics treated in the series.

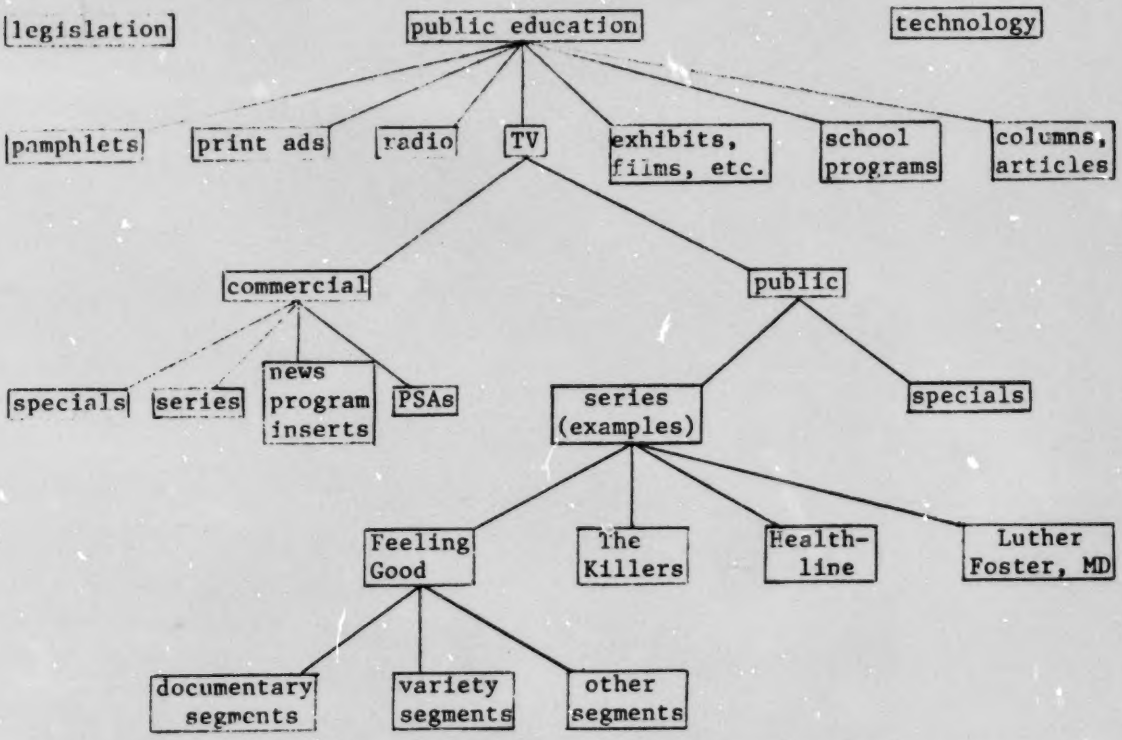
Nutrition was treated in 14 segments on four programs. There was some evidence that the series prompted viewers to have more fresh fruit or fruit juice and to use a steamer to cook vegetables, but viewing did not lead to reduced consumption of foods high in saturated fat. Knowledge effects included increased awareness that butter contains more cholesterol than margarine, that it is unwise to eat the skin

of chicken or turkey, that eggs are high in cholesterol and that steamed vegetables are more nutritious than boiled vegetables.

I should mention an addition to paragraph 1 of the abstract. There were, in fact, 24 programs but 11 were one-hour programs and 13 were half-hour programs. We started initially to make a series of 26 one-hour programs. But after we had six on the air, a decision was made to change the format and length of the programs.

Figure 1 shows graphically how our effort fit into the overall conceptual scheme one might envision for modifying nutrition behavior.

Figure 1. Some mechanisms for modifying nutrition behavior.



Obviously, you can try to influence nutrition behavior through legislation and regulation or you can do it through technology. There is public education, which has a lot of vehicles. One of those is television. Within television there is a split in this country between commercial and public. On commercial television there are specials and series and news program inserts and public service announcements and the like that deal with nutrition to some extent. On public television there have been series and occasionally a special. I show several examples of health-related series on public television here, some of which deal with nutrition, some with broader health concerns. Then, within "Feeling

Good" there are documentary segments, variety segments and other kinds of segments. I will show you a few examples but there is no real way to give you, in a few minutes, a good sample of all the kinds of pieces used in the series.

Table 1 will help to explain why our task was so difficult. Entertainment programs on television have one job, to attract an

Table 1. Requirements for various types of TV programs.

Requirements	Entertainment	News, Public Affairs	Instructional TV	Commercials	"Feeling Good"
Attract and hold audience	x	?			x
Be accurate and fair		x	x	?	x
Convey information effectively			x	?	x
Persuade viewer to take action				x	x

audience, so that when the commercials come along a lot of people are watching. Entertainment programs don't have to worry about accuracy or fairness or conveying information or getting people to do something because that is not their job.

News and public affairs programs I put a question mark there on attracting an audience because news is big business these days. They do care about the number of people who watch. And yet, as you all know, audience size is not the sole basis for judging a public-affairs documentary or news program. They are supposed to be accurate and fair and they are in trouble if they are not. They don't really get assessed in terms of whether they convey to people an understanding of the issues dealth with and they are not supposed to persuade anybody to do anything.

Instructional television doesn't have to attract or hold an audience because the audience is self-selected. People come because they want to learn something. ITV has to be accurate in what it conveys and it has to convey information effectively because whether people learn is in fact how instructional television is judged. No persuasion is involved.

Commercials don't have to attract an audience; it comes anyway. It is a carry-through from watching other things. Accuracy and fairness?

Well, people who produce commercials will say, "Yes, we have to be accurate and we have to be fair, or our competitors will jump on us and the government will jump on us!" But there are such challenges to the accuracy and fairness all the time. That's why I place a question mark there. The same is true in terms of "convey information effectively." In many cases if you can convey "affect" rather than information--a feeling about a product or an idea--that is all that is needed. Sometimes you want people to learn about a product; sometimes you want them to do something else. But commercials are judged in terms of whether the product moves off the shelf, so there is an "x" there.

And now we get to "Feeling Good." There is an "x" in all of those requirements. That's one major reason we had a problem. Trying to get producers to get a feeling for doing all these things simultaneously turned out to be very difficult. People who had come from news and public affairs, for instance, weren't used to having a commercial orientation, the "get-somebody-to-do-something" orientation. Somebody who was used to doing commercials didn't have to worry about attracting an audience and being entertaining, and so on.

A friend of mine in the advertising business, when he first heard about the series, said, "Oh, you are talking about 26 hours of commercials you want people to watch voluntarily." Nobody had put it that way before, but that's exactly right.

Let's go on next to a summary I've developed which I've called, "Some Considerations in Selecting Topics, Content and Goals."

Some Considerations in Selecting Topics, Content and Goals

Importance of Problem

How important is this problem in relation to other health problems? How many people does it affect? What kinds of people (e.g., children, adults, the elderly)? Is it fatal, disabling, restricting or only annoying? How costly are its consequences for society, the family and the individual?

Efficacy of Actions Recommended

Are there actions which an individual can take to prevent or ameliorate the problem? How effective are these actions? Is there controversy regarding their effectiveness?

Feasibility of Action Recommended

How likely are people to take the action recommended? If the action costs money, can they afford it? If it requires access to facilities, are the facilities available? Do people dislike or distrust individuals they may deal with in following a recommendation? Do others around them oppose taking the action recommended? Would taking the action conflict with their personal values or self-image? Is the action painful or boring or inconvenient? Do people believe it will do any good? Do they think

the problem could affect them? Are messages likely to be present from other sources which would reinforce or undermine the recommendation to act?

Relation to Other Campaigns

Is the problem one which has been or is being treated in a number of public education programs? If so, how effective have such programs been? How likely is it that we can produce TV material sufficiently different from, and more effective than, other material on this topic to justify treating the topic in the series? Are health agencies concerned with these problems more likely or less likely than those concerned with other problems to cooperate with the series and thus increase its impact?

Measurability

What kinds of changes in knowledge and behavior regarding this topic are measurable in ways which will provide a valid indication of the series' effectiveness? How likely are the measures to be costly, require access to confidential records, involve a large field staff or influence the outcomes they are intended to assess?

Information Points as Appeals

If the problem affects some population subgroups more than others, should people be made aware of this? What would be the probable effect of doing so? Is the problem one about which one should try to arouse fear or allay fear? If the problem is one that people can do little about as individuals, should they be told this or should they be told only about the things they can do? What points of information, individually or in combination, are most likely to lead people to take recommended actions? How great is the risk that, by emphasizing a point we view as important, we may actually decrease the number of people taking the recommended action? Are some information points or appeals likely to produce a negative reaction in some people while producing a positive reaction in others?

Audiences

What specific population subgroups are most affected by the problem? Are they also the ones in the best position to do something about it or should the programs be addressed mostly to others? What proportion of the people affected have tried previously, and unsuccessfully, to do something about the problem? How much do they know about it? How many people hold incorrect beliefs about its seriousness, its causes or intervention methods? How many are afraid of it, apathetic about it or merely resigned? How much public interest is there in the problem and what is its perceived importance in relation to other problems? How many people feel that the importance of the problem, coupled with the prospects for successful intervention, can justify individual or collective actions as control measures? How many people, and in what population subgroups, will be receptive to information about the problem?

Goals or Objectives

How much change should be produced by a single exposure to one segment of a given program, by exposure to several related segments of a program or by various combinations of exposure that may occur overtime? Should goals or objectives be stated in terms of intent, such as "To motivate viewers to do "X," or in terms of directional outcome, such as "To increase X," or in terms of amount, such as "To increase X by 10%?" Should specified objectives include desired changes in knowledge or attitudes as well as in behavior?

These are dimensions we took into account in trying to select what to deal with and what to say about the things we decided to deal with. The second item, for instance, "Efficacy of Actions Recommended", is an example. Are there actions which an individual can take to prevent or ameliorate the problem? How effective are these actions? Is there controversy regarding their effectiveness? Well, any time we talked to one nutritionist, we were okay. Any time we talked to two, we were in trouble. There was controversy regarding both the importance of any problem with which we wanted to deal and the ways of dealing with it. We tried to develop criteria for selection such as whether the problem was more important than other problems, whether there was something one could do about the problem and whether it was feasible for them to do it. Other criteria were whether somebody else was already doing a similar effort, whether we could measure the outcomes, whether we had something to say, what kinds of audiences we were trying to reach and what specific goals or objectives we could identify for it.

I have never done any work that was harder than this selection process. Information was not available in some cases. So we were having to make decisions as you all have, I'm sure, with some ambiguity and uncertainty about what was the best thing to do. We looked for up-to-date, comprehensive, projectable information about what people already know and do concerning nutrition. But there is more information available now than there was then. For example, General Mills recently put out a report that summarizes information from several surveys: A Summary Report on U.S. Consumers' Knowledge, Attitudes and Practices about Nutrition, 1980. We could certainly have used that seven years ago but couldn't find anything like it at the time.

Now, let's deal with "Other Considerations--Intentions vs. Reality."

Other Considerations -- Intentions vs. Reality

1. Use of behavioral goals and "Writer's Notebook"
2. Use of data on target audiences
3. Undermining barriers to taking recommended actions
4. Use of multiple appeals and multiple treatments
5. Use of entertainment
6. Recruitment of "influence agents"
7. Concern about side effects
8. Use of referral spots
9. Pretesting of programs

The point here is that what we intended to do sometimes did not turn out to work in reality. At first we developed a "Writer's Notebook" from a large file of material for each program -- backup materials, articles, commentaries, writeups of interviews with consultants and advisors and so on. But the "Writer's Notebook" turned out to be too overwhelming for some of the writers and producers. It then became a file folder with a section on each topic and program. That was still too much for some folks, so it finally came down to one page, single-spaced, typed on both sides. That's what was used to put some of the programs together.

We had behavioral goals for everything, 70 or so with some quite specific intended outcomes. We tried to provide suggestions for producers and writers as to content that might be effective in getting people to do things and in filling people's information gaps. We tried to use data on target audiences whenever we could. We tried to "undermine" the known barriers to taking recommended nutrition actions. We tried to identify a lot of social, psychological and perceptual reasons people have for not doing things we wanted them to do.

We had assumed, since it is so difficult to get anybody to do anything, that we would try multiple appeals and multiple treatments. If one didn't work, another one might. There were health-related appeals and there were social appeals. There were saving-money and staying-out-of-the-hospital and avoiding-disability and being-healthier and feeling-better appeals and so on. We used multiple treatments, figuring that if one kind of format didn't do the job we would reinforce a given point by presenting it in three or four ways.

We tried to use entertainment to attract an audience. We were aware at the start that the audience for public television under-represents people at high risk in terms of nutrition. The people who most needed the information would be the ones least likely to voluntarily watch any information programs. Information and documentary programs attract fewer viewers. As professionals, as smart, educated folks, as part of an elite two percent in this country, you may say, as you view the segments, "There's lot of fluff in it, why don't they just give them the information, tell it to them straight?" Often if you do give the information and tell it to them straight, they don't watch, at least not on open-circuit television. There are other more structured settings where this may work fine.

A lot of the entertainment attempts, I think, didn't work out very well. One of the important things we learned was that while it's okay to try to be serious and miss, it's <u>not</u> okay to try to be funny and miss. People get angry if you try to be funny and don't make it. I'll have more to say later about the use of entertainment, the kinds of entertainment and the execution versus the concept.

We tried to recruit people to influence their friends to get a blood-pressure check, have fruit, start exercising, whatever. We assumed that, by using the <u>efficiency</u> of television in reaching lots of people and the <u>effectiveness</u> of interpersonal communication to get somebody to talk one-on-one to a friend, we would have a combination of efficiency and effectiveness. In fact, that is one of the payoffs that was demonstrated

from the series. We did have kids saying things to their parents, parents saying things to their kids, people saying things to neighbors and friends.

An ancient medical motto says, "The first thing is to do no harm." Normally in educational programs you don't have to worry about the risk of doing harm or having negative side effects. The problem is to make anything happen at all. But here there was some concern about telling people things that would somehow lead them to avoid doing what we wanted them to do. In nutrition that is not much of a problem. But in the case of a topic like cancer one may increase the likelihood that people would deny a symptom and thus postpone presenting it to a physician.

In all programs we had "referral spots" cut in. These gave addresses or telephones where people could write or call for more information. We tried to get local stations and local voluntary organizations to do this. We also had a national backup with the National Health Council and other organizations.

We had hoped to pretest every program with audiences in time to identify any problems and re-edit or make substitutions if needed before going on the air. In only one case, the pilot program in the summer of '74, were we able to test the heck out of it and improve that program before using it in the series. We in the research group were supposed to get programs two months before air date. As it turned out, the research group in the office and PBS in Washington were getting shows at the same time, three days before air time. We did audience research on almost all these programs but there was no time to change them after testing. Perhaps the test results could influence a show three or four or five weeks down the road but obviously not that show itself.

Table 2 on the next page gives you a quick idea, in the left-hand column, of the 20 or so topics. Across the top are the production formats. Under nutrition we had 41 minutes and four programs in the set that we evaluated. We used some others, such as one entire program on overweight, but it is not included in this list.

Let me describe our opening sequence. It appeared each week to introduce the show and to reacquaint viewers with the continuing cast of about six people. It provided motivational pieces, information pieces and a kind of "glue" in the programs.

The program was a magazine-style show with film segments, documentary segments, music segments and many other different kinds of things. In between these clusters this group of folks, who all worked in the same shopping center, got together at Mac's Diner and talked about the topics we covered in the program.

The evaluation findings on "Feeling Good" are a condensation and integration of four separate studies done by outside contractors. The findings of these studies discussed in the next paragraphs give you some indication of what evaluation studies produced in the way of outcome data.

Table 2. Production formats used

TOPICS	documentary	song	drama	interview	"vox pop"	"commercial"	comedy sketch or monologue	demonstration or lecture	self-test (quiz)	parody	host comments	other	approx. minutes of treatment	no. of programs
heart diseases	1	3	1			3	1	4	2	1	1	2	74	7
alcoholism	1	2	3	1		1	2	1	3		1		74	6
parenting	3	4	2	1	2	2	3						49	5
mental health	2	4	1				1				1	1	46	4
nutrition		4				3	2	2		3			41	4
breast cancer	2	1		1			1	2				1	38	2
accident prevention or control		2	1		3	5	2	1				2	37	6
doctor/patient communication and patients' rights	2	1	2	2	4		4	2			1		35	4
prenatal care	1	2				1	3	1				2	34	3
exercise		3	1		1	1				1		1	34	4
vision	2	2				1		1			1		33	3
dental care		2			1	7	2	1		1		1	33	6
stress	1			1		1	1	1			1	1	18	1
hypertension		3				4	3	1				1	26	5
hearing	2	2				1	1	1			1	2	20	2
allied health personnel	1	1	1				1					1	19	2
health insurance		1	1				1					1	11	2
uterine cancer	1	1				1							7	1
immunizations					1	1	1						5	1
colon-rectum cancer								1					4	1

Nutritional themes that appeared in both the series and the evaluation program included the desirability of reducing cholesterol intake and increasing consumption of fruits and vegetables, reducing sweets in children's snacks and preparing foods to preserve nutrients. On the cholesterol reduction theme, the series was only partially successful in increasing the awareness of the high-cholesterol content in egg yolks. However, the series was credited with increasing knowledge that chicken or turkey skins should be avoided and that butter is higher in cholesterol than margarine. This did not translate into behavior change, however.

Evaluative measures on the food preparation theme were restricted to interim measures where small samples made it very difficult to demonstrate statistically significant differences. Nevertheless, changes in awareness of reasons for steaming vegetables registered as statistically significant in one case and suggestive in another.

On a nutrition-related theme, there was evidence of learning that eating fruit can help clean one's teeth. There was also some evidence that viewing the series led respondents to increase their intake of fresh fruit. Treatment Group A was asked: "Have you done anything new or anything different as a result of watching 'Feeling Good'?" The free responses of self-reported and self-assessed behavior impact elicited by this question fell predominantly into the nutrition category. Some examples were:

> "We all started watching our diets much closer to make sure we were getting daily doses of the vitamins needed and exercises were started once again!"
>
> "I have tried to prepare the right meals and to encourage my husband to exercise in moderation."
>
> "I was not aware of the extremely low nutritional value of foods at a fast-food joint."
>
> "Since January I've lost ten pounds -- and it was the result of watching your program."
>
> "I've started weighing myself daily and when I get five pounds over I start doing something about it."
>
> "I'm losing weight. Your show helped me realize overweight is not good. I watch my diet and exercise more."
>
> "I learned about cooking vegetables to keep nourishment to a maximum."

"I watch the number of eggs we eat and try to eat more carrots and try to see that they (kids) get rest and proper exercise. I did cut down bread and bacon and fatty foods, put in more vegetables and raw carrots in salad and cut down on sweets."

"I now skin a chicken before cooking it."

"I learned about calories and the value of foods to the body and what different foods do to your body."

"I now shop for vegetables and meats instead of instant stuff."

"Now I give my little girls fruit instead of candy."

Table 3 "Summary of Data from Formative Research for 'Feeling Good'" on the next page (page 12) indicates the materials we had people view, how many people were involved, what method we used to show the materials to them, what data collection methods we used, what kinds of things we studied and what kinds of designs we used. Table 4, "Some Examples of Findings from Formative Research" are shown on the page after that (page 13). On the third page (page 14) in this series is Table 5, "The Summary of Data from Special Studies" of one kind or another.

For instance, there was a "laugh-track-effect" study. In our programs there was no "sweetening," no studio audience. So we sent about 25 minutes of programs and sample pieces to Hollywood to add applause and laughter and the like. With applause and music over the transitions and with laughter the things that were supposed to be funny seemed funnier and the program went "zip!" It seemed like five minutes instead of 20. If you go back and look at the original one, it seems so slow and so ponderous. The only difference was the addition of a little sound, careful sound, nicely done. But it makes a big difference.

Audience appeal was higher with the laugh-track added. However, there was less clarity in the learning of the content. Either people took it less seriously or they were distracted by some of the sound.

So how are we supposed to give producers advice on what to do? We said you can use the laugh-track and more people will watch or you can leave it off and more people will learn. If you are supposed to get people to both watch and learn, good luck!

On the fourth page (page 16) I've shown Table 6, a "Summary of Data for Summative Evaluation of 'Feeling Good.'" This shows the source -- Gallup, NORC, Response Analysis, Nielsen -- and the kinds of data they collected and how they got it. It is much more complicated than I can convey quickly.

Table 3. Summary of Data from Formative Research for "Feeling Good"

Material Viewed	N	Material Distribution Methods	Data Collection Methods	Factors Studied	Designs Used
"VD Blues," "I Am Joe's Heart," "National Health Test," PSAs	604	CCTV, 16mm film	Questionnaires, group interviews, observation of viewers, program analyzer	Knowledge gain, segment appeal, overall reaction, perception of performers	Pre-post Solomon 4-group, post-only, simultaneous viewing & responding
CTW Sample Reel	786	CCTV	Questionnaires, program analyzer, group interviews, personal interviews, observation of viewers	Segment appeal, cast appeal, segment credibility, knowledge gain, topic interest, overall reactions, effects of laugh track	Pre-post, post-only, simultaneous viewing & responding
CTW Pilot Show	1,910	CCTV, on-air broadcast	Questionnaires, program analyzer, observation of viewers, telephone interviews, observation of behavior	Knowledge gain, segment appeal, cast appeal, voluntary viewing, behavioral response	Pre-post, post-only, simultaneous viewing & responding, controlled field experiment
7 one-hour "Feeling Good" Shows	655	CCTV, on-air broadcast	Questionnaires, program analyzer, group interviews, observation of viewers	Appeal, knowledge gain, perception of information, topic interest	Pre-post, post-only, simultaneous viewing & responding
4 Constructed Reels	478	CCTV	Questionnaires, program analyzer, group interviews, observation of viewers	Appeal, knowledge gain, perception of information, motivational effect of various themes	Pre-post, post-only, simultaneous viewing & responding
13 half-hour "Feeling Good" Shows	1,986	CCTV, on-air broadcast	Questionnaires, program analyzer, group interviews, observation of viewers	Appeal, knowledge gain, perceptions of information, topic interest	Post-only, simultaneous viewing & responding

Table 4. Some Examples of Findings from Formative Research for "Feeling Good"

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1. Self-tests and other formats which involve the viewer directly rate high on both appeal and ability to convey information.

2. Appeal and comprehension are directly related; in general, the more a segment is liked, the greater are the chances that it will be remembered correctly. Both appeal and comprehension tend to be related to the perceived usefulness of the information conveyed.

3. Television and film segments using fear appeals are liked much less than those with attractive content, such as a demonstration of correct behavior.

4. Segments with a strong emotional or fear appeal tend to be understood less well than those with a straight informational style and the latter are more likely to be mentioned to others by viewers.

5. Terms which denigrate persons with certain kinds of health problems (e.g., "fatso" or "drunk") receive a negative response.

6. Viewers sometimes draw incorrect inferences from dramas or comedy sketches. Such segments frequently hold interest and score high on appeal but some audiences have difficulty distinguishing factual material from statements made for comic or dramatic purposes.

7. Believable dramatic situations can convey information effectively to diverse audiences, including those whose ethnic or other characteristics differ from those of the performers.

8. Songs are a high-risk format for conveying health information and inducing positive effect toward a recommended behavior. Some are regarded very favorably while others are seen as inappropriate or foolish in the context of a health program.

9. Parody is a poor vehicle for conveying health messages. They are often misinterpreted, especially when viewers are unfamiliar with the basis for the parody.

10. The use of a "laugh track" with televised comedy segments increases the number of people who find them appealing but tends to decrease the number who understand the messages they contain.

11. In the context of a program with low information density, documentary segments and straightforward presentations of facts are usually far more effective than one might expect from their performance in isolation.

12. Differential interest in various topics tends to override differences in themes or approaches to these topics. For example, programs about cancer elicit more interest than programs about other topics, regardless of whether the appeal is to altruism or self-interest and whether the theme is prevention or treatment.

Table 5. Summary of Data from Special Studies for "Feeling Good"

Study	N	Data Collection Methods	Factors Studied	Design
Laugh track effects	319	Questionnaires, program analyzer	Laugh track vs. non-laugh-track versions of edited sample reel: segment appeal, cast appeal, moment-by-moment appeal, comprehension of information points	Treatment vs. control with matched sub-samples
Title options	519	Telephone interviews	Reactions to proposed titles for series	Single survey
TV viewing preferences	1,208	Personal interviews	Reported viewing of selected programs on public and commercial TV	Single survey
Topic & theme	571	Telephone interviews	Interest in viewing programs proposed for health series	Single survey
Topic interest	1,975	Questionnaires	Interest in health topics and program descriptions	Single survey
Health knowledge	1,188	Questionnaires	Knowledge of selected health topics	Single survey
Health beliefs & actions	Various (400-5,063)	Personal interviews, telephone interviews, mailed questionnaires	Beliefs & actions re selected health topics	Five surveys
Immunization messages	34	Questionnaires	Reactions to varied levels of threat in a message on immunization	Post-measure experiments
Host options	147	Questionnaires	Appeal of potential hosts for Season B	Single survey
Viewing check	584	Telephone interviews	Awareness & viewing of series and single program; viewer characteristics	Coincidental survey
Smoking show	171	Mailed questionnaires	Reactions to show B-12 (smoking), comparison of Seasons A & B, perceptions of appropriate audiences for series, preferences for day & time of broadcast	Single survey

Table 6. Summary of Data for Summative Evaluation of "Feeling Good"

Source	Site	N	Data Collection Methods	Factors Studied	Design	Dates
Gallup	U. S. (national samples)	6,286	Personal interviews	Awareness & viewing of FG & other series, PBS signal reception, specified health behaviors	Repeated measures with independent samples	12/74, 2/75, 4/75, 5/75
National Opinion Research Center	Oak Cliff area of Dallas	468	Telephone interviews, personal interviews	Viewing of series; knowledge, attitudes, behavior re series topics	Field experiment with panels of induced viewers, induced non-viewers, & controls for measurement effects	10/74, 12/74, 1/75, 2/75, 5/75
Response Analysis	Boston, Seattle, Dallas, Jacksonville, (Fla.)	6,134	Mailed questionnaires	Viewing of series; knowledge, attitudes, behavior re series topics	Pre-post and within-wave comparisons of viewers & non-viewers, with control for measurement effects	11/74, 12/74, 1/75, 2/7[illegible] 4/75, 6/7[illegible]
Nielsen	U. S. (national samples)	2,000	Audimeters & viewing diaries	Viewing of series	Panel	Weekly 11/20/74 through 9/30/75

We had a nationally prominent group of folks on a research advisory committee. We were not able to please all of them at any one time which will not surprise any of you. Some of the barriers we ran into we called things learned, affirmed, or guessed. They are listed below:

1. Although television reaches almost all American homes, the medium's ability to convey health information through a regular series is limited. Commercial TV normally will not carry special-interest programs in prime time. For a variety of reasons, public TV currently attracts only a small proportion of its potential viewers, and people with above-average health needs tend to be underrepresented in this audience.

2. A series distributed nationally can serve as a stimulus to action on the community level when an effective outreach program is in operation.

3. A series such as "Feeling Good" can succeed in motivating viewers to seek additional information about topics treated and to encourage their friends and families to take recommended actions.

4. A weekly series on preventive health behavior probably cannot draw substantial numbers of viewers from the audience normally watching entertainment programs.

5. A mass medium such as television is necessarily somewhat inefficient as a means of reaching specialized target audiences with information about topics of limited interest to the general public.

6. Most people probably would not devote one hour each week (or even a half-hour) to watching a program on health maintenance, no matter what format is used or how well it is produced and promoted.

7. In a continuing series of programs it is extremely difficult to blend entertainment, information and motivation. Each of these elements sometimes works against the other two.

8. Continuity of production staff is critical if the experience gained in early phases of a long-term project is to be cumulative and beneficial.

9. Staff commitment to the general objectives of a purposive series is also critical. Producers and writers must feel that program goals are both important and attainable. This implies that production staff should be involved in the process of goal selection.

10. Unless fairly detailed information regarding the characteristics of target audiences is obtained in advance of program planning, it is likely that program content will include some elements regarded by viewers as inappropriate. Offering people information they already know is perceived as condescending and thus has a negative effect on reactions to programs.

11. Non-health appeals (such as social approval, altruism and identification with persons liked or respected) may be at least as effective as health appeals (such as avoidance of disability) in promoting recommended health actions.

12. There is no formula for producing health-education material that will guarantee reaching a general audience effectively. Some characteristics of successful material have been identified but the number of possible combinations of characteristics is so great that a condensation becomes highly abstract and thus less useful. Guidelines, yes; a formula, no.

Next I'd like to deal with some unresolved issues. There are obviously many more than the ones listed here, but I thought you might at least want to think about these while we have an opportunity. There are five of them which I think are especially thought provoking and which we still find we can't answer satisfactorily.

1. Combining "messages" and entertainment
   - --separating vs. combining purposive material and entertainment
   - --"bait/freight ratio" within a program and a series
   - --information density
2. Defining target audiences broadly vs. narrowly
   - --multi-topic programs for general audience vs. single-topic programs for special audiences
3. Determining strategy for scheduling
   - --time of day
   - --day of week
   - --repeat broadcasts
4. Selecting alternative television vehicles (cost, reach, effectiveness, etc.)
   - --series
   - --specials
   - --public service announcements
   - --news program inserts
   - --commercials
   - --talk shows
5. Deciding on evaluation dimensions
   - --audience size
   - --audience characteristics
   - --effectiveness in changing attitudes or increasing knowledge
   - --effectiveness in motivating behavior
   - --extent to which resulting actions improve health status

I do hope there are some findings and some non-findings in this very large and very expensive project that give you ideas for further research and for better practice of nutrition education in the future. Perhaps we made some contribution to the development of theory in the areas of nutrition education and mass communications.

Question-and-Answer Session

Question:
Have these been rerun at all?

Swinehart:
The one-hour programs originally ran from late November through January, and the 13 half-hour programs ran from April through June. The 13 half-hour programs were reruns the following summer but have not been rerun since.

Question:
Are they in the public domain or what?

Swinehart:
They are not in the public domain. A lot of people have asked if they can use them but there is a real problem on the rights. To save money on talent fees the producers used restrictive contracts which granted rights to show the programs only on public broadcasting and only for a limited period. It might be possible to use certain segments but new contracts or payments would be needed.

Question:
Jim, have you any idea how much it would cost to do a program like this now, one 30-minute program?

Swinehart:
It is hard to estimate because there are so many elements: production costs and talent, fees and all that. Network shows often cost $300,000 or more, but there are also programs that are done for $25,000 or less with people sitting around a table.

There is a format that several people are using now which I think is promising. This is the semi-preproduced program that you send around to local stations. The National Heart, Lung and Blood Institute has one on hypertension. They did some film or tape pieces and prepared questions and answers for a script that local stations could then use with local people. So they provide a package on a preproduced basis for a local station and then the local station does a little bit -- splices things together, uses its own talent with your script and gets a lot of credit. And you can do this with nutrition. The FDA was considering a similar kind of program on sodium.

Question:
Watching and listening to your presentation suggests to me that there are two warring factions in this production, the entertainment values and those of the program content. That's what your evaluation shows as a major problem. If you were approaching the same objective today, what would you do differently in your programming?

Swinehart:

I would probably try to do two different programs. It's very hard to do a single program for people who are really health-concerned-information seekers and at the same time appeal to the people who wouldn't read a pamphlet if you handed it to them. Those folks are so different from the information-seekers that I really don't.

Question:

What about the situation now with cable? You talked about trying to get local networks to promote viewing. Would there be more of an opportunity for nutrition now with cable's open channels?

Swinehart:

I think the answer is yes. All these local cable outfits with 20 channels--and 107 channels are on the spectrum--will need material to fill their air time. So I think if we do some good programming it will be used. It should be accurate, it should be authoritative, it should have some sort of cachet or endorsement that helps market it. My guess is there would be a lot of takers.

Question:

Jim, who paid for "Feeling Good?"

Swinehart:

There were four main funders; altogether there were a total of 16 funding organizations. The largest amounts came from the Corporation for Public Broadcasting, Robert Wood Johnson Foundation, Exxon and Aetna. Several other foundations helped significantly, as did two voluntary health associations and two federal agencies. The total cost was $7.4 million, including about $600,000 for research. The overall cost worked out to about 25 cents per viewer per program.

Question:

How successful was the format in bringing to public television the target audience for the program, which I presume was people who are not natural information-seekers about health.

Swinehart:

This was the target. And these are often people who are not aware of public television or who don't watch public television very much. The one-hour programs didn't do badly in that respect. We were reaching a million people a week and some of these were people who normally wouldn't have watched public television or health programs. When the program switched to a half-hour, with a more serious tone, we did lose some of the lower-income, lower-education audience. The weekly numbers usually ranged from half a million to a million and a half. Even if they had been three or four million, we still wouldn't have had much penetration of the audience you are talking about. We would have needed to reach five or ten million people and public television rarely does that during prime time.

Appendix
Reports of "Feeling Good" Summative Research

Keither W. Mielke and James W. Swinehart, Evaluation of the FEELING GOOD Television Series. New York: Children's Television Workshop, 1976.

An overview of series development and evaluation, including a synthesis of studies conducted by the four independent research contractors cited below.

Summary: Evaluation of the FEELING GOOD Television Series. New York: Children's Television Workshop, 1976.

A condensation of the detailed report described above.

Morris N. Cohen and Herbert 1. Abelson, Impacts, Benefits, and Consequences of FEELING GOOD. Princeton, New Jersey: Response Analysis Corporation, 1976.

A study conducted in Boston, Dallas, Jacksonville (Fla.) and Seattle to assess effects of voluntary viewing. Using mail questionnaires, approximately 4,000 adults responded before, during and after the test interval of November 20, 1974--May 21 1975. Subgroups of a panel-effects control group (not pretested) received either a mid-series or a post-series measure.

Michael J. Minor and Normal M. Bradburn, The Effects of Viewing FEELING GOOD: Results from a Field Experiment in a Low-Income Community. Chicago: National Opinion Research Center, 1976.

A field experiment with substantial low-income and minority representation (all female), conducted in Dallas, Texas, using personal and telephone interviews (N=400+). Random assignment to a group induced to view and be interviewed, a group induced only to be interviewed, or a group receiving no inducements; sub-categories added later were based on actual viewing experience. Interview waves before, during and after the test interval of November 20, 1974--May 14, 1975.

The National Audience for FEELING GOOD. Princeton, New Jersey: The Gallup Organization, 1975.

Four national surveys using personal interviews with independent samples of 1,500+ adults each. Surveys were conducted between December 1974 and June 1975. Assessed awareness of FEELING GOOD, sources of awareness, incidence of viewing and incidence of selected health care practices.

Nielsen Television Index Report on FEELING GOOD. New York: A. C. Nielsen Company, 1976.

A brief summary of national audience ratings for FEELING GOOD from November 1974 through January 1975 (Season A), April through June 1975 (Season B) and July through September 1975 (Season B rerun). The estimates are based on the Nielsen national Audimeter sample of TV households and include both average audience and total audience figures.

CASE STUDY III DISCUSSANT

STUDYING THE ROLE OF TELEVISION FOR NUTRITION EDUCATION

Katherine Clancy

As I read the information that Jim sent, my first thought (and my friends know I have these thoughts all the time) was to throw up my hands and say, "Whatever in the world am I going to say about television?" For me, that question is close to my job. I'm the nutritionist for the Federal Trade Commission (FTC). But let me say right now that I'm not at this meeting as the nutritionist from the FTC. I'm here as Kate Clancy, nutrition educator and researcher. I also feel somewhat burdened by this issue as the current Society for Nutrition Education (SNE) president. The results of the legislative priorities ballot that SNE sent to all its members indicated that, number one, our members want us to deal with the use of media for nutrition education. That was a surprise. In fact, I hardly know what to do with it, and you will know why when I get to the end of my comments today.

People have been trying to discover the relationship between television and food habits for about ten years now. I think they have met with more or less limited success. There has been some theory building but it has been in only a few areas. This made me realize that when we talk about television and the mass media we may mean at least four different things. So I thought I would first outline my categories and then review the research in each of these four areas to see where we are.

First of all, television is a medium to be used for nutrition education at either the local level, through the nationwide private networks or on public television. Second, television is a medium which can be studied for its content of food-related messages either in programs or ads. We at FTC have spent the greatest amount of time studying the food ads on television. This is sensible considering that food ads comprise the largest segment of all of those advertisements. Third, television is a medium to be studied, once removed, as it affects behavior. That comprises the largest area of research. What is television's effect on people as it relates to food and nutrition? Finally, television is a variable and this may be its most important role. It is a variable in any other study that any one of us ever does on food behavior in the United States or in any other country where the majority of citizens view TV on some regular basis.

Formal Nutrition Education Efforts

Let me go through these, one by one. In the first category, a medium to be used for nutrition education, is programs like "Feeling Good." I want to point out, as Jim did, that we should remember that it was a health education program and certainly not a nutrition education program. I'll have something to say about that later. It was on public television but it had to live by the ratings (and, of course, died by its ratings).

"Feeling Good" was also a community program. Jim didn't talk about that very much but there was a major community outreach component. It would be interesting for us to know, in terms of the community nutrition model, what impact that outreach had on communities. It would be interesting to know, too, what the outreach workers felt when they saw the program going from one geared to low-income people to a middle-income format with Dick Cavett as host.

I'll reiterate what Johanna Dwyer said yesterday. If you tried making this program now with the same nutrition messages, you couldn't do it or would find the attempt very difficult. There were a lot of interesting nutrition messages presented but most of us would not agree with the way in which they were produced. Production problems seemed to dictate the message. Nutritionists had very little to do with the program. Joan Gussow's and Norge Jerome's input was long-term but, although their counsel was sought and heard, it was rarely applied in program development. Would there have been more of an impact on nutrition messages if the producer had seen nutritionists as having greater status?

Jim said that when people were asked if they had done anything new as a result of watching the show the answers across all the shows fell predominantly in the area of nutrition. That response is really fascinating. This is despite the fact that the producer of the show had said nutrition was one of the three or four topics at the bottom of a long list in terms of interest. Why? Why did viewers respond to nutrition? Was it easy to make the changes in food patterns that were suggested? Was nutrition of much higher interest than the people who planned the show thought it was?

All these questions could be asked in another media setting although I don't know if that setting will appear. Jim outlined the things he learned while doing the show. Don't lose that list. I don't think we are going to get the chance to do that kind of thinking again and we had better use it to construct what theory we can.

There are other programs in this category of a medium used for nutrition. Each is very different from the others. We have "Mulligan Stew" aimed at children. We have the Stanford Project and the USDA snacking project. We have the Community Nutrition Institute project, which incorporates some other types of community outreach, and then we have our old friend, Public Service Announcements (PSAs).

A tremendous amount of personal effort, Cooperative Extension Service money and God only knows what other money have gone into the last ten years' production of nutrition PSAs. We have no idea what the total impact of those announcements has been. We haven't studied it. We haven't had a really good, full review and critical analysis of all the literature on it and most of it isn't even in the literature. Out at the National Agriculture Library, we at least have a collection of a lot of the existing pieces, and I'm still suggesting that somebody try and do something with that collection.

There are some good pieces. There is the Porter and Novelli work on how to look at a PSA and how to make a PSA more effective. However, whether or not we can use what we have built up and what we do know is a big question.

The reasons we don't have a collective body of theory or information about PSAs, I think, fall into two major categories. First, an inherent characteristic of PSAs is lack of control. Although the message is under the control of the person putting together the PSA, and is hopefully under the control of the nutritionist working on the project, the placement is not under their control, the viewing is not under their control, where it appears in the schedule is not under their control. It's clear why it's so difficult to evaluate PSA projects when so many uncontrolled variables must be measured. The second reason I think we have not developed a theoretical understanding of PSAs is a little bit more complicated. I once did a logical sequencing of the steps it took to explain why you might be able to get food behavior change through a PSA campaign. I'll tell you that the logical steps number at least ten. There is not an arithmetic progression and, in fact, in some cases there are what Johanna would call leaps of faith between the steps. There are huge caverns in the logic as we progress from the fact that there is a lot of chronic disease in this country to the step that says, "Yes, and we ought to do a PSA to help change that situation."

Those two things together, I think, help to explain why the use and study of PSAs is so difficult. I will finish by saying that changes in the law that are being considered right now in the Federal Communications Commission may make this whole discussion moot because there may not be any incentive at the community level to run PSAs.

Program Content

In the second area, where the content of television is a medium to study, the most recent studies on television advertising and program content have been the Economic Research Service work at USDA (1) and a lovely study by Kaufman (2). She points out that the major message about food consumption in commercial television programs is drinking. Coffee is shown more often than alcohol but alcohol appears quite frequently. In some programs there is an alcohol message in the program itself every ten seconds.

As far as the issue of advertising on television, I'm not going to bore you with what you've heard before. But I do feel in some ways that television is one of our biggest problems in nutrition education. The largest yearly outlay for food and nutrition information, surpassing by 80 times the amount of money spent to do "Feeling Good," is for advertising food products on television. Most of those food products are not suggested by the Dietary Guidelines. It is very powerful competition for formal nutrition education with its very meager funding.

Effect on Audience

There are three different kinds of research approaches to take in this third category of studying the effect of television on viewers. By far the largest volume of such nutrition education research is that done on the effect of television advertising on children. There has been enough fact-collecting and fact-building so that I think we have probably come fairly close to having some decent theory.

Another kind of research is that which studies adults. This may be the smallest category of studies in all of nutrition education research. I recently reviewed food advertising literature and only identified five studies in this area. Two of them were my own (3,4). One is the study from University of California, Davis (5), and there is the absolutely elegant research conducted by Falciglia and Gussow (6) at Teachers' College. After that "there ain't much," and it follows from what I said above that these studies are not adequate in number to serve as theory generators.

The final type of study of audience effect is evaluation studies of programs like "Feeling Good" or various Cooperative Extension Service programs. I put them in a separate category because I think the evaluation methodology is quite different from studying the effects of the advertising "per se."

TV as a "Life" Variable

The final category is TV as a variable in all other studies. I think this is where we probably have fallen down the most. You can read most studies that have looked at people's food consumption and food behavior and never once find the words media or television. I think it's obvious why there is this avoidance in that it probably will never be possible to account for or measure the effects of television.

I was thinking about the nice research model Leann Birch was describing yesterday where she can observe a phenomenon and manipulate the environment and look at the phenomenon again. Then I was thinking of the even "cleaner" model (an even more unrealistic model for our purposes) of people doing research in labs with tissue cultures. There, if you want to know the effects of a nutrient, you take the nutrient out of the tissue culture, you see what happens and then you put the nutrient back in. I would love to be able to take television out of the lives of all the people in the United States for a year and see what happens and then put it back in again. But we can't do that. In fact there may be no more control groups. When the last satellite went over the Appalachian mountains about seven years ago, we lost the last chance we had to study a population in the United States that didn't have television. So we have to find other very, very clever and creative ways to look at the effects of television.

The Questions to be Asked

I have some moderately random points to mention in relation to research questions for which we need to pursue answers. One, we need to keep asking, What is the relationship of health to nutrition in the viewer's mind? What kinds of theories could be developed that describe the relationship between health thoughts and food/nutrition thoughts?

A second point that comes to mind is that we need to acknowledge that we are doing food and nutrition education, not just nutrition education. Most of the messages "Feeling Good" presented were food messages. We can't really do a nutrition message without doing a food message, too, unless we want to turn people off completely. We should be more up-front about that and phrase our research questions in terms that acknowledge this understanding.

A third point is that we should always ask the question, What is the context in which any nutrition intervention is undertaken? For example, "Feeling Good" was sending a message about cholesterol. But it's not clear that there was a sensitivity to the fact that there were people in the audience who had listened to messages about the cholesterol content of margarine for at least 15 years. You would guess that there would be some relationship between the response to the "Feeling Good" message and the long exposure to the oils and margarine ads. That type of hypothesis should be examined because it has importance for the so-called saturation point in any educational effort.

Finally, I once made a statement that if counter-messages were being developed for children, if you wanted to teach about brushing teeth as a "counter message" to sugared cereal commercials, for example, it would be important to show both "ads" in the same time frame. When the manuscript came back to me I was asked to give a reference to document that statement and I couldn't, of course, so I dropped it out. Something tells me intuitively that television is a different medium than a school or a home learning situation where you might not necessarily have the two messages presented together. Again this is something that could be studied.

In summary, I don't believe that, except in the area of advertising effects on children, we have much of a theory built around mass media and nutrition. If we don't have any theory, though, we do have the next best thing and that is hypothesis and assumption testing. I would just make a plea that a strong effort be made to make hypotheses explicit in all research reports and proposals. I'm concerned that in some cases the reason why this is not done is that there is no hypothesis being tested. This does not advance the cause very fast. I would encourage all purposeful theory building and hope that we can return in the not-too-distant future to compare notes again.

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DISCUSSION GROUPS AND PROCEDURES

Group A:

Emerita Alcantara
Carolyn Byrd-Bredbenner
Katherine Clancy
Johanna Dwyer
Ann Grandjean
Gloria Kinney
*Kathryn Kolasa
Jeffrey Milstein
James Swinehart
Jane Voichick

Group B:

Rosalie Amos
Henry Breitrose
John Conner
Ann Hertzler
Carolyn Lackey
Audrey Maretzki
William McDonald
Rebecca Mullins
Barbara Shannon
*Harriet Talmage

Group C:

Leann Birch
Guendoline Brown
Isobel Contento
Barbara Fontana
Marianne King
*Luise Light
Rodney Leonard
Tony Meyer
Grace Ostenso
Helen Ullrich

Group D:

Jean Bowering
Judy Brun
Frances Cronin
Alyce Fanslow
Peter Miller
Peter Rossi
Richard Selover
Ann Shaw
*Laura Sims
Allene Vaden
Elizabeth Yetley

* Facilitator responsible for initiating and guiding the discussions.

Participants at the conference were randomly divided into four groups for the discussion sessions. These groups were maintained throughout the conference.

Small-group sessions were scheduled following presentation of each of the three case studies and the remarks of the discussants for the case study. Extra time was scheduled for discussion on the final day of the conference so the groups could each reach consensus on any "dangling" issues and prepare a final report.

Each group received a set of recording sheets on which they were to summarize in writing the major points made in relation to each of the following topics:

1. The three case studies as illustrations of the theory-building process, as sources for ideas to be adapted to future research approaches, as contributors to theories and knowledge in the field, etc.

2. Theoretical frameworks as applicable and adaptable from related disciplines, as uniquely specific to nutrition education, etc.

3. Nutrition education defined, its conceptual framework identified.

4. Questions in nutrition education that are "researchable" and how this term is defined.

5. Questions, issues and concerns that must be answered in ways other than by the research process.

6. Participants' comments on application of ideas developed by speakers to their own research.

7. Specific suggestions for future action.

For the third discussion session each group also received a "green sheet" which contained the following "final assignment" question:

What do nutrition education researchers need to do if the theoretical framework of the field is to grow and develop? If high-quality research in the future is to be facilitated? (Be specific, give examples, analyze suggestions in terms of feasibility, cost and impact. Make suggestions for accomplishment.)

SMALL GROUP CLOSING REPORTS

Luise Light, Moderator:

While you're munching cake and sipping coffee there's one task remaining to us before we all go home. Talking with various people between the end of the last group session and lunch, the delightful lunch that Dairy Council has arranged, I get a sense that many people feel, as our group felt, that something really happened in these last two and half days; something that was important, very important, to the field of nutrition education research. That's the sense I've gotten from individuals around the room, but the proof is in the pudding. I guess we'll only know when we hear from you what happened in your group.

They tell me that the President enjoys recounting the Chinese fable of the man who was hungry, was given a fish to eat, and found it satisfied his hunger. Someone opined that if they taught him how to fish he might not be hungry again. And I have a feeling that something like "learning to fish" has happened at this conference in the last two and half days. We certainly have ample fish to eat. But beyond that we've been taught some things and we've learned some things. So maybe we can fish in the future.

Let's start with Discussion Group A. Group A, have you identified a reporter who has something to share with us? O.K. Would you like to come up here, Johanna and tell us what happened?

Johanna Dwyer, Group A:

This is the report for Group A, a very brief summary of many things about which we talked. Kathy Kolasa, our facilitator, and I will each take a turn in presenting this report. I'll cover the various case studies, and then Kathy will cover the final wrap-up of the green sheets.

We spent a good deal of time discussing Dr. Breitrose's presentation, the first case study. And this discussion generated several important points. We felt that theory building was inhibited, in part, because of problems of accessibility to large data bases that already exist because there's a proprietary nature to many of them. In other cases it's simply that the investigators who originally collected the data would be perfectly happy to have it further analyzed if only they and the interested parties connected up with each other. However, we believed that even if this were to happen there would be difficulty in terms of getting the material published. In this field traditional views of data analysis and emphasis on use of primary instead of secondary data are sometimes stumbling blocks in getting things published. In other words, the reviewers for research journals seem to favor only new data, rather than the re-working of old data, as something that's worthwhile. Also there's a problem in terms of getting funding for reanalyzing existing data.

One unique thing about nutrition education that has particular implications for our research approaches, we decided, was the problem

about what the educational message is to be. We need to work on clearing this up, even if it's that we agree to disagree.

The final point that the first case study led us to make was that nutrition could be viewed in many different ways. It could be viewed as a subfield of consumer education, as a subfield of education, as a sub-set of biological sciences, or in many other ways. We don't wish to suggest one is best or needs to be selected but instead that research from a variety of such perspectives is needed to advance the field.

The second case study by Dr. Birch was also productive in terms of our thinking. The discussion centered mainly on the identification of related disciplines which have theoretical frameworks most applicable to nutrition education and research efforts within the field. We spent a good deal of time getting together a list. People agreed that education and psychology were likely the two most important. We then discussed relevant subfields within education and psychology which might be particularly important. By the time we finished the discussants had mentioned learning theory, developmental and social psychology, educational psychology, psycho-physics and physiological psychology (with some people disagreeing on the relevance of those two) sociology, economics, and philosophy (with most people disagreeing on its usefulness to us), statistics, and epidemiology (with mixed reviews on that, too).

Then we went on to talk a little bit about the kinds of nutrition education research and identified three categories. The first is not very elegant. What I've got down here is research on biology or the biological things--"what is good and bad for you,"--is the way it was phrased in the group. The second category of research we see as that looking at factors affecting food preferences--culture, food, choice, buying, preparation and the like. We saw Birch's work as falling pretty much into that second type of nutrition education research. The third category of research is that which identifies and studies intervention strategies designed to make changes in dietary behavior. We felt that the Breitrose case study fell into this third group.

The Birch case study raised or demonstrated a number of procedural issues. It illustrated that researchers can find rich material in studying and documenting what practitioners say they have observed, something that came out in yesterday's lecture by Walberg when he mentioned that practitioners are a source to be used in theory building and in the identification of important research hypotheses. In addition, Case Study II was a good example of how a manageable problem, small-scale research and a single investigator rather than a large team can make very important contributions to our knowledge base. Finally it was remarked that theory is not now viewed by funding sources as an important organizing principal around which things are funded.

With the third case study, the general consensus was that it emphasizes the need for nutrition educators to develop more knowledge of television, not just as a mass medium but also as a communications medium. Of special concern in terms of specifics to which we devoted a good deal of discussion were four issues. The first was characteristics

of viewers--viewer demographics--especially characteristics of viewers at various times of the day and week. The second was the potential of instructional television for effective nutrition education. We also spent time discussing the difficulties and differences among the great variety of ways of informing, reminding, and persuading people through the use of television and how such differences need to be used to our benefit depending upon our educational objectives. Fourth, we spent a good deal of time talking about the rise of cable TV, its effects on network programming, changes in TV in general and how these all might work for good or for ill from the standpoint of nutrition education efforts that involve this medium.

Kathryn Kolasa, Group A:

I would like to present our recommendations in response to the question on the green sheet concerning what we need to do to move ahead. We listed six different points in some detail but let me give you the "meat" of those recommendations. One is to develop a support base for nutrition education research which naturally includes money support, not just philosophical and public support. Two, we believe it is important to identify low-cost projects that can add to the field of knowledge needed to form a base for theory. Three, we need to pay better attention to improving organization of nutrition education research, including things like making sure projects have hypotheses that are explicit. Fourth, we need to clean up some details in the field, many of which Barbara talked about the first night,such as looking at Public Service Announcements (PSAs) in foods and nutrition to see what we can learn there, learning what's going on in the National Agriculture Library and other resource centers with the objective of working on systems for better access to information, providing better structures for university faculty to participate in interdisciplinary research groups with release time from teaching, and "packaging" classic studies in enough printed detail, including references, to use in teaching and research. A major recommendation was continuation of conferences like this where theories applied in designing nutrition education programs and research projects can be presented and discussed in the way that we have the last couple of days, leaving conferees to go home, look again at their own projects and bring a new perspective to them. Our sixth recommendation is to encourage the Society for Nutrition Education or other groups to organize people who are willing to meet together and to write chapters for a monograph where theories used in other disciplines that are applicable to nutrition education research can be summarized.

Harriet Talmage, Group B:

Group B, I guess, wasn't very systematic although we did engage in a productive discussion of the case studies and explored their implications for nutrition education research as a field of study. We thought we were getting some place and we thought we were building toward some things but after hearing the report of group A I have doubts.

At the end we did stick our necks out. In fact, we stuck them out so far that I put it on an overhead. It is erasable so if we are

attacked too much we can always say that there is a mistake in the line we drew and quickly make a change.

We made a clear distinction between theory building and theory utilization and between the basic and applied disciplines. For an applied discipline like nutrition education research, theory utilization will have a greater payoff for the present than will theory generation. Theory utilization is a more productive route for our young field of study. That doesn't mean one doesn't support the other. We see that theory utilization research feeds back to the whole theory-building process, especially in the potential for shaping the initial theory. As nutrition education draws on theory from other disciplines, it also challenges the theory and may contribute to the theory by either illustrating its predictive power or reshaping the theory to reflect the specifics and address the unique problems and concerns of the field of nutrition education. Thus there is an integration or interplay between the building and the utilization.

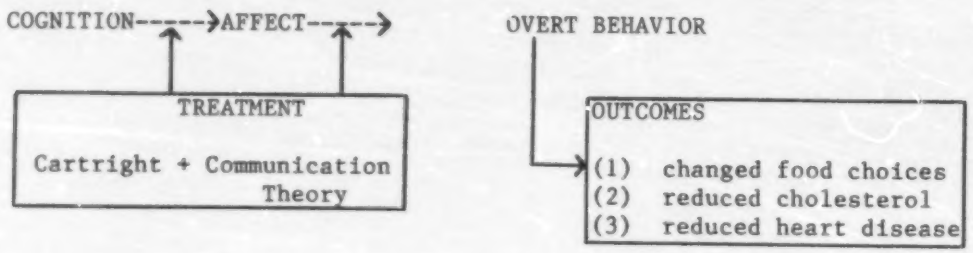
As the case studies illustrate, we also made a distinction between research and evaluation. Evaluation involves studying the effects of an intervention. It is conducted in real settings with real people. Research, at least experimental research, involves a manipulation of some variable under controlled conditions and is subject to replication. Both research and evaluation can be and should be predicated on a conceptual or theoretical foundation, however. This is a very simple and inadequately described distinction but we believed it important and suggest it be further clarified in the work of researchers in the field.

We were very careful to distinguish between nutrition as a field for research study and nutrition education as a field for research study. Each field has its unique focus. What distinguishes the two is the word "education." Education is a process that broadens behavior options or shapes one's characteristic behaviors. Nutrition and its research provide the content guidelines or standards on which nutrition education research can build intervention programs. Nutrition research also helps to identify salient relationships between behavior and results for the applied researcher to probe and to subject to the critical interpretation of the "real" world.

The first case study, the Stanford project, emphasized theory utilization rather than theory building. It started with a medical problem to be remediated. An outcome was specified and a theory of human behavior selected to guide development of a remediation treatment and selection of a method for delivering the treatment. The Cartright theory explicates relationships between cognitive, affective and overt behaviors. Building on these relationships, a treatment which was assumed to be the means for bringing out these relationships was developed that would be instrumental in leading to the desired outcome--change in blood cholesterol level and subsequent reduction in heart disease. A second example of theory utilization involved interpersonal communication via selected media presentations.

The entire intervention or treatment, as shown in Figure 1, is predicated on a host of linear relationships, but the characteristics which specify or explain a rationale for the relationships remain elusive.

Figure 1. Theoretical relationships among the various aspects of human behavior and treatment as illustrated by the Stanford project research design.



Each separate relationship indicated by the dotted lines could well go in both directions and this should not preclude interactions among these three types of behaviors. The outcomes are measurable from overt behavior, assuming valid and reliable measurement methods are available and are used correctly.

We saw Case Study II as an example of nutrition education research. This was in contrast to Case Study I which was an evaluation research study of an intervention program.

As the researcher explores relationships and establishes tentative explanations, new hypotheses emerge which suggest further questions for inquiry (e.g., determining conditions for positive and negative food preferences or types of inducements associated with positive/negative food preferences.) As the researcher pursues these questions, a body of data builds which may yield reasonable explanations and possibly lead to plausible theory that has predictive capability. If questions are studied systematically rather than helter-skelter or by trial and error, then the way the researcher designs the study to respond to the questions should be guided by reasonable assumptions and theory.

The questions of where we get our assumptions are important ones and again, for good nutrition education research theory building, assumptions must be rational and reasonable and reflect the state of research findings and existing theories to this point. Our group members strongly urged us not to forget that assumptions must come from the conceptual structures and models we select to guide our work. We cannot just make any assumption we want when building our research designs. There has to be as strong a foundation for our assumptions as for the theory that we may be using.

We talked about model building or the development of paradigms starting with a level where one is aggregating facts, where small research studies generate data that build to the next step, a conceptual framework. We think we found an excellent example of a research study that works out of a conceptual framework in Case Study II. In the figures on page 2 of Dr. Swinehart's handouts (see these proceedings, p.44) you can see how discrete pieces of information were put into a structure that could guide researchers to ask, "Where are some of the knowledge gaps? What questions need answers? Are there identifiable relationships between what we want and the type of TV format we are going to go with?" It takes unsorted, discrete pieces of information about program requirements and types of TV programs and puts them into a structure that permits or provides for comparison, suggests relationships and identifies voids. Through such a conceptual framework research questions emerge, existing theories are brought to bear on explaining or predicting the relationships and, through the pursuit of answers to the questions, new theories are suggested.

Case Study III was a program-development/program-evaluation project. It could be said to be guided by many types of theories but it was not clear from the report whether theory guided initial decisions or were grasped after the fact to lend credence. Certainly several theories about human behavior and behavior change could have been applied. For example, modeling behavior and media impact work is applicable.

Now comes a sharing of our discussion on what we called "levels of theory building." Theory building, if it is to be of value to our field, should avoid a search for the <u>one</u>, grand, comprehensive schema for organizing all the disparate knowledge associated with nutrition education research. Rather we ought to look at levels of theory building to which we can make reasonable contributions. Out of these there may emerge good competing theories that describe and arrange facts and relationships in ways that have predictive potential for testing. We can productively engage in several levels of nutrition education research which will hopefully lead to theory generation.

<u>Level 1</u>. This level involves research of the literature. For an applied field this is critical. If <u>education</u> is central to nutrition education research and is what distinguishes it from nutrition research, then all fields of study related to education become the domain of nutrition education research. This would include theories of learning, theories related to changing/modifying behavior, instructional theories, curriculum theory and communication theories to name only a few. Thus Level 1 involves approaches that help nutrition education researchers become conversant with those areas from which researchable questions can evolve as a springboard for further work. The best nutrition education research will be based on an understanding of research in other areas that have important things to say to nutrition education research. In other words, nutrition education researchers must know their roots.

In the main, the role of Level 1 of theory building will not lead directly to generating new theories but will provide the background for selecting those theories most pertinent to a given research study. We are dealing with theory utilization, sorting and selecting. Level 1 can later give structure to this process, to the unsorted facts, information and discrete research studies floating around out there.

Level 2. We can call this the categorization or classification level of theory building. This type of theory building activity draws on the syntheses of the literature developed at Level 1 by creating classification schema for sorting common elements among the disparate bits and pieces of research results we have found which will help us in nutrition education. For example, we can sort rocks by hardness, color, shape, etc. This type of classifying schema will lead to the identification of critical attributes.

Level 3. This level involves identification of relationships and assumptions underlying statements about relationships that we see in our classification schema. For example, assumptions that underly relationships between food preference and food consumption begin to come to the surface at this level.

Level 4. Level 4 takes theory building one step further up the ladder. It refers to the creation of conceptual frameworks. A conceptual framework draws together classification schema and relationships and provides a structure of organizational arrangements, hierarchical relations or unidirectional/multidirectional/interactive relationships. Through such a framework missing elements are more easily identified and assumptions underlying relationships become more clearly delineated. Alternative ways of structuring an area of study are provided and this, in turn, suggests alternate ways of asking researchable questions.

Level 5. This level takes conceptual frameworks one step further. Model building or structural modeling provides a representation of areas within a field that draws on extant theories to restructure our way of conceptualizing areas within nutrition education research. Good models suggest research with potential for shaping extant theory to better fit nutrition education research or for even assisting in generating new theory.

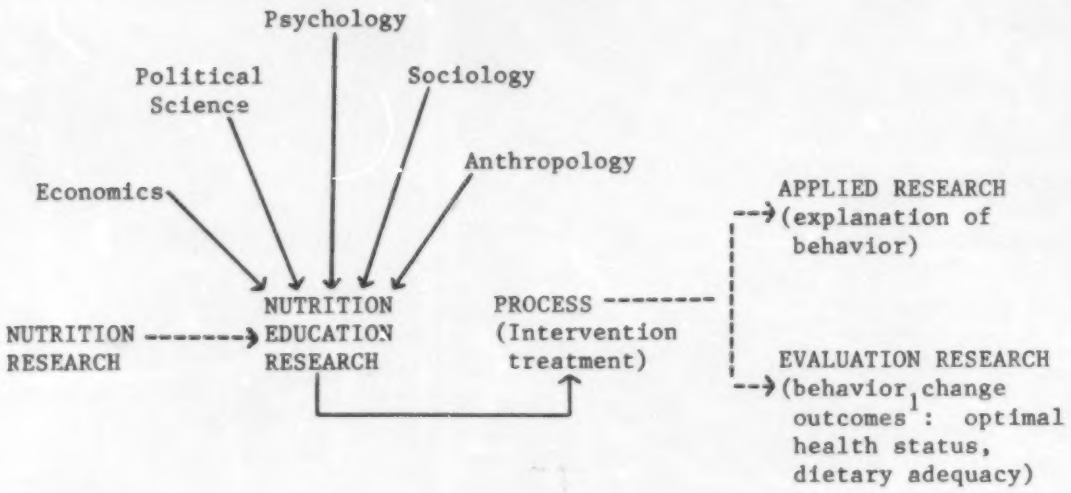
Nutrition education researchers have so much pioneer work yet to do on the first four levels that at present these are the levels to focus on unless some remarkable breakthrough takes place unexpectedly. Thus theory utilization is recommended until the field is ripe, through well-conducted nutrition education research encompassing theories taken from the supporting disciplines, for a comprehensive theory of its own.

We tried to look at the field and say, "Can we give some kind of pictorial representation to what we think we are saying?" as we try to develop some conceptual structures. We looked at nutrition research and at how it is drawn upon by nutrition education research. We said that the word education becomes a focal point for identifying what is unique about nutrition education research as distinct from nutrition research. We said that this field is an applied field and we have to feel

comfortable with that. It draws on many other fields and we need to sort through what theories can be utilized from those other fields such as cognitive psychology. Nutrition education researchers need to be committed to this process of sorting and synthesizing from many fields to identify salient theories and good assumptions upon which to build research. Nutrition education is the process of delivering an educational message and motivation, regardless of what format that particular educational delivery takes and regardless of who is receiving it. All those within the process become variables to test in our research. We need to better understand the theory from whence our process is modeled to develop our assumptions and hypotheses.

We also have some unique products or outcomes we are looking for, and here's where our field for research gets more mudded. Behavior change means different things to different groups. Ultimately the question is, "What is good education and what are the behaviors that result from it?" We tend to define behavior as that which optimizes health status, staying away from clearly defining what we mean by "that which" and to some extent what we mean by "health." We have a continuous link, then, from nutrition research to nutrition education to dietary adequacies, another vague concept that has to be developed and challenged along the way. We have illustrated these in the diagrammatic representation in Figure 2. It shows the relationship between nutrition research and nutrition education research, illuminates the role of other disciplines in contributing theories and shows how nutrition education research draws on both nutrition research and the theories from other disciplines to study and intervene in the educational process through applied research or evaluation research.

Figure 2. Representation of nutrition education research as a field of study.



[1]Which behaviors are amenable to change? How and under what conditions do changes occur? Cost effectiveness?

We ended up attempting to define the field of nutrition education research. We said that its thrust is on food choices and their consequences for health status and dietary adequacy. In other words the focus is on: 1) how food choice behaviors are formed and reinforced, 2) how food choice behaviors are maintained or changed, and 3) what consequences result from various behaviors in terms of health status and adequacy of one's diet. Some might view that as a very narrow definition but we felt comfortable with it.

To study the two hows we draw heavily on theories from the supporting disciplines of social sciences and communication. For the first how, theories on formation of behaviors serve as a guide for selecting assumptions, relationships and variables for the study. Results can challenge the theory, broaden the theory, suggest new avenues to explore, or possibly reorganize the theory to encompass the new data and outcomes.

We briefly discussed two other points. One has already been mentioned but if it keeps being repeated from group to group it must be important. We must get a better handle on the research in related areas and the salient theories upon which we can draw. No one nutrition education researcher can have a handle on all these fields but we do need to be knowledgeable about what is out there to be applied to our own work. Some vehicle--monograph, review series, or yearbook--for sharing syntheses of studies that have addressed themselves to issues of relevance to nutrition education and have utilized theory from related disciplines is needed. There isn't such a thing as one grandiose synthesis. There are many.

Also, syntheses are not reviews of studies, but serve to bring together research studies and analytical studies and provide a "conceptual framework" or type of comparative structure that clarifies the "state of the art" as represented by these studies. The case studies presented here each identified a very important area being explored from many facets. Looking at the research done in food preference development is one example of an area for fruitful study.

The other point briefly discussed, and something for funding agencies to consider, is need for specification in Requests for Proposals that the proposed research emanate from an identified, documented and rational theory or reasoned conceptual framework and should lead to a potential contribution to nutrition education theory.

Barbara Fontana, Group C

You can all look at your list of those who were in Group C and probably make some judgments of your own about the kind of discussion which resulted. I can classify the discussion as fairly theoretical. We are not, as people, bound by structures and so we approached our discussions with great fervor without allowing the discussion guides prepared for us to inhibit our discussion. After spending several hours together we did come to a consensus and hold that the following points are evident.

First of all, there is presently no organizational structure in nutrition education research. There is need for a plan which identifies what the research issues and strategies are. Conceptually, I look at this as similar to a Rubic's Cube where we are looking at a number of dimensions coming together in this plan. On one dimension we need to identify the goals and objectives. Another would identify the various plans and strategies to be used to reach them. Another side would identify the various institutions in the public and private sector which could implement that plan, financially, politically, etc. Once that plan was developed, support groups and maps could be added to support the process of carrying out the plan.

Secondly, there is a need for a collaborative approach in the entire field of nutrition education research and its efforts toward theory development. There is a great theoretical base of knowledge already available in allied fields, we already have the subject matter base of nutrition and we should habe a collaboration. This collaboration is critical. We support what Harriet just said that we need theory utilization rather than theory generation at this particular time. We illustrated this belief with the analogy of what has happened in the allied health field. They have a health belief model. They started with the process of utilizing, begging, borrowing and stealing other people's theories and applying them until they reached the stage where they now have their own theory. We contend that some day nutrition education will be in the same good position. We also contend that the field is not ready to conduct a meta analysis similar to that which Walberg talked about the other day. We don't feel the research specifically in nutrition education is far enough along for such an analysis to be that useful. But with a plan for the field we will some day be ready.

A third problem we cited that effects our planning and collaboration efforts is the lack of a defined training for ourselves as nutrition education researchers. We don't mean to say that licenses and rigid curricula are needed but the field does need to discuss its needs for educating its own members and to assume responsibility for implementing good programs.

In the end we made the following concrete recommendations:

1. There is need to have a strategy for gaining the financial and appreciative support to do the work that we know needs doing once we have our plan.

2. There is need for individual researchers to apply existing theories to their research problems.

3. There is need to structure collaborative research planning groups who can provide guidance to those who conduct nutrition education research. The Society for Nutrition Education might put together a group who tracks the application of ideas from other disciplines and

programs to nutrition education research. Or a group could monitor and identify models and conceptual frameworks useful for various discrete areas within nutrition education research. Or, as another group said, some kind of summary of research from a theoretical basis is needed to tell us at the end of each year how far we have come in achieving our plan and our goals and what the next steps are.

4. There is need for a group to monitor policy decisions in areas that are relevant to nutrition education research. We need to look not only at federal policies but at such things as environmental factors which may potentially influence nutrition education and which may suggest potential research targets.

5. There is need for a reward structure for members of the nutrition education research community which would recognize outstanding contributions to the field.

6. There is need to foster a lively dialogue among a broad base of relevant disciplines, using the expertise of these disciplines to continue to build the field of nutrition education research.

7. There is need to create public awareness of the importance and value of nutrition educaiton research.

8. There is need to set up an ad hoc committee on nutrition educaiton research theory development, perhaps through the Society for Nutrition Education (SNE).

9. There is need to begin to have at least an annual half-day conference probably somehow tied to SNE's annual meeting to look at research progress on a continuing basis.

10. There is need to conduct multidisciplinary conferences such as with social science researchers to get other perspectives and philosophies for nutrition education.

11. There is need for an annual nutrition education research meeting, such as the fine one National Dairy Council has sponsored this year, to make sure that all the recommendations we are making become reality.

Ann Shaw, Group D:

I will say we had a lot of fun in discussion but didn't generate nearly so long a list of recommendations. Very briefly and at the risk of sounding like a broken record, I'll go over a few we have.

We decided that nutrition education research will gradually acquire its own body of applicable theory as theory is borrowed from other disciplines and found useful. The first step, however, is the necessity on the part of all researchers to spell out explicitly the theories or hypotheses which are directing any particular nutrition education research project being conducted. These theories will provide the rationale for our decisions on what we are looking for (our hypotheses?) and also will justify and direct how the research is carried out. When these are made explicit others can then see, through the testing and revision process, if they were useful. This can give rise to new theories and more testing. It is the kind of cyclical cummulative process that happens in all sciences.

We decided that we needed to look more closely at education, to put the education back into nutrition education research. There is much already done through the research in that discipline which we need to apply. Following that we need to look to the field of communication.

More permanent formal mechanisms for collaboration among scientists and educators must be established. Some suggestions were to present a call for papers on the integration of educational theory into nutrition education and to continue a forum for nutrition education researchers at the SNE annual meeting. At these sessions professionals from other fields could be invited to present theories that could be useful in nutrition education research. A continuing forum for nutrition education researchers in SNE, perhaps a "division of research," is needed. Large separate conferences are not necessary on a frequent basis but a mechanism for continuing discussion and collaboration among nutrition education researchers is desired. And graduate training in the field of nutrition education should provide more systematic training of students in the relevant behavioral and social sciences to enable them to effectively tie in and adapt applicable theories from these fields.

Finally, the field needs a publications policy which encourages publication of theoretical research. That means we need more analytical and conceptual papers concentrating on theory development. And data-based papers need to place more emphasis on theoretical bases and conceptual frameworks in the introduction and discussions. Perhaps this should even become a requirement for JNE publication. "Well-done failures" should also be published since much can be learned when theory is "falsified." There seems to be a current bias toward publishing only "successes," even when these studies are poorly done.

Now let me share with you some of our specific comments concerning the three case studies. Case Study I, "Multimedia and Bicultural Approach to Nutrition Education" by Breitrose, was discussed as an example of a large scale, expensive, long-term study. While this study was considered successful in obtaining its desired clinical outcome (lowering plasma cholesterol) in the test communities, its primary value was demonstrating the fact that changed behavior is possible, given an

all-out approach. Its success was considered more important in a political sense than in a theoretical sense. Here a clinical outcome was sought, probably for political and funding reasons, but may not be required in all nutrition education interventions.

A large-scale study of this sort appears to have a number of drawbacks for purposes of building theory:

1. Community studies involve a large number of variables which cannot be controlled and may not even be recognized or measured.

2. Unintended outcomes must be anticipated and measurement of these planned. For example, a survey instrument itself is an unintended intervention.

3. In large-scale interventions different aspects of treatment are not separated out sufficiently to test the theory involved. For example, in the Stanford study, which aspect of the intervention was most important--the media, the print materials, or the high density of persons reached by the intervention program (social networking effects)? Therefore, it is hard to build theory from such large-scale studies.

4. Some of the intervention treatments used or planned in large scale expensive studies--such as clinical evaluations and follow up for participants--are impractical to transfer to other nutrition education programs, thus limiting the wider application of results from such studies. Also, some techniques are operator dependent and may not work well for other agencies. Methods and materials were specific to target audiences and desired outcomes and may not generalize well to other settings. These approaches might work very differently in large urban areas where a lower proportion of people would likely be reached by the "blitz."

From the standpoint of building theory, smaller sequential studies would be more useful, especially if assured funding could be arranged over a sufficient period of time. As a practical matter in this period of limited funding we may need smaller, discrete well-defined studies which can be part of other long-term projects. Development of a linking theory or conceptual context to give order to a patchwork of individual studies should be given appropriate attention and priority.

Case Study II, "Food Preferences and Eating Patterns" by Birch, was discussed by our group as an example of a small-scale, well-controlled laboratory experiment. Laboratory studies of this type yield information on what variables can be effectively manipulated, i.e., what changes are possible. This information may be used in designing larger

community intervention studies. For example, if factors contributing to a change in food preferences can be identified in laboratory studies, a community project like the Stanford project may consider using media to change those factors. From this work others can be developed to guide the design of further studies in other settings.

What other aspects of Leann's work have application to larger studies? Hypothesis generation for studies of use of food in parent/child interactions and relation to child's weight might be considered. Similar data on adults, i.e., factors contributing to change in food preference, could be gathered.

Direct translation of laboratory results to community interventions are not always evident. For example, food preference is complex as a consumer-decision variable. Consumers may think of and prefer several foods together, as in a meal context. Hence, Leann's study of preferences for individual foods may be too simplistic for direct application but her work on peer influence on food choices may extrapolate easily to community systems where the effectiveness of peer influence as a manipulative variable may be tested. Some examples are strategies using peer influence to increase breast feeding adoption and the concept of "change agents" as an educational technique of the Cooperative Extension Service.

As mentioned in the presentation by Dr. Walberg, from those theoretical variables which have been shown to influence the desired outcome it is important to identify those which can be changed at a practical, cost-effective level. This may be mostly a policy decision but is, none-the-less, important in theory application.

We did not discuss the third case study by Swinehart. Most of the group seemed to feel it represented an even more generalized case of a large-scale intervention similar to the Stanford study. Desired nutritional outcomes and target audiences were ill defined, precluding any conclusions for theory building in nutrition education. Design of such interventions should build upon tested theory, but large expensive media interventions can seldom provide sufficiently specific information for theory building because of their diffuse, multi-purpose, multi-audience nature.

Going on to the topic of theory for nutrition education research, the group felt that nutrition education research as a field would gradually develop its own body of theory by borrowing and adapting theory from relevant applied fields such as education, psychology, sociology and communications. The challenge to nutrition educators is the appropriate application and adaptation of borrowed theory.

Theory should tell us what to look for and how to go about conducting the research. It should be testable. Following the research, the theory should be revised and adapted on the basis of results and retested. The process, like theory building in other sciences, is cyclical and cummulative.

The first step in theory building for nutrition education research is explicit expression of the theoretical basis for a nutrition education project. Expected outcomes should be stated and meaningful. The methodology should be consistent with the theory. Target audiences, intended effects and possible unintended effects should be identified. Only when the theoretical basis of individual studies is explicit can the results of these studies be effectively used in building a conceptual framework for the field.

The question of appropriate criteria for borrowing theory from other disciplines arose, as we agreed that we should look harder for appropriate theory to borrow from allied fields. Some mechanism for training nutrition education researchers in selecting and utilizing appropriate theory is needed. This would be especially helpful for nutritionists who received their primary training in the physical sciences such as biochemistry and physiology. Among the fields considered relevant as sources for applicable theory, the field of education was suggested as perhaps most important for immediate attention.

Some standardization of research methodology was regarded as important if results of individual studies are to be combined to develop a unifying conceptual framework. Although the 24-hour recall is a reasonably standard dietary method, HANES, NFCS, and MR FIT use different data bases for evaluation. Different knowledge and attitude tests are used in different studies, often with no validity, reliability and instrument development information provided. We need to establish some reasonable "standards for methodology standardization." There is value in sufficient flexibility to allow nutrition education problems to be investigated from different perspectives but measures should be valid and reliable. Validity of the measure relates to theory because it relates to purpose of the measurement.

We became involved in a discussion of the question, "What is Unique about Nutrition Education?" Translation of nutrition research results to educational applications must go through food, which is value laden. Many other factors than nutrition influence food choices. Access to food is related to food availability and to economic status of the target audience and determines how well people can act on the message delivered in nutrition education. The nutrition education outcome sought usually requires some action by the recipient. This action may have beneficial physiological effects but these may seem far off in time and less pressing than more immediate costs or other barriers. These were some of the points mentioned in our discussion of the uniqueness of the field.

Luise Light, Moderator:

You have all done a wonderful job. I have a feeling that one could give a new name to this conference. We could call it "Getting Organized." It sounds like we have an awfully lot of work to do.

I personally want to thank the National Dairy Council for giving us an opportunity to find out who we are, how we can get ourselves together and where we need to go in the future. It has been a very rich and rewarding experience for all of us researchers. I personally am happy to have had the opportunity to dialogue with fellow workers, people who are pondering the same problems, views and concerns as I, and to share the perspectives which are sending us home with better ways of doing our work. It has been a very, very special privilege to have this opportunity and I again want to thank National Dairy Council for giving it to us. Thank you all for coming.

1:30 p.m. Third General Session — Ottawa and Chippewa Rooms
Ardyth Gillespie, Presiding

Case Study II: "Food Preferences and Eating Patterns"

Leann Birch

Discussants:

Isobel Contento
Audrey Maretzki

3:15 p.m. Coffee Break

3:30 p.m. Small Group Discussions — Conference Parlors

5:00 p.m. Rest and Relaxation

7:00 p.m. Dinner — Ottawa and Chippewa Rooms

9:00 p.m. After Dinner Coffee and Conviviality — Conference Parlors

Friday, November 13

6:30 a.m. Fourth General Session — Ottawa and Chippewa Rooms
Laura Sims, Presiding

Case Study III: "Planning and Evaluating Television Materials on Nutrition"
James Swinehart

Discussants:

Katherine Clancy
Anthony Meyer

10:15 a.m. Coffee Break

10:30 a.m. Small Group Discussion and Report Preparation — Conference Parlors

12:00 Noon Checkout Time

12:15 p.m. Luncheon — Ottawa and Chippewa Rooms
Luise Light, Presiding

Small Group Reports and Discussion

2:00 p.m. Adjourn

The real purpose of scientific method is prediction, the discovery of certain theories or generalizations that anticipate future occurrences with maximum probability. — John W. Best

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